TEXTILE WORLD

KINK BOOK

VOLUME IX

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KINK BOOK—VOL. IX

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(Technical Editor, Textile World)

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FOREWORD

It is always a great pleasure to present a new Kink Book to our friends who read TEXTILE WORLD. So many of these friends co-operate during the year in supplying material for the Questions and Answers Department of TEXTILE WORLD that we really consider the publication of these annual Kink Books to be a mutual undertaking.

For the information of new readers we might explain that for many years it has been the practise of the publishers of TEXTILE WORLD to compile what they consider the best technical questions and answers submitted by mill men during the preceding year and to publish this in handy book form. If your travels take you among the mills, you will find thousands of superintendents and overseers who have considerable collections of these annual Kink Books. Any practical mill man who has such a collection of Kink Books possesses a technical library on practical mill work which can scarcely be excelled. There are few problems in mill operation, production and management which have not been covered by these questions and answers.

The demand for Kink Books has been so large that we have had to place a price of $1.00 per copy for those who are not subscribers to TEXTILE WORLD. Every subscriber to TEXTILE WORLD is entitled to his choice of one Kink Book free with each year's subscription. Subscribers who wish to acquire additional Kink Books may purchase them at the special price of 75 cents per copy.

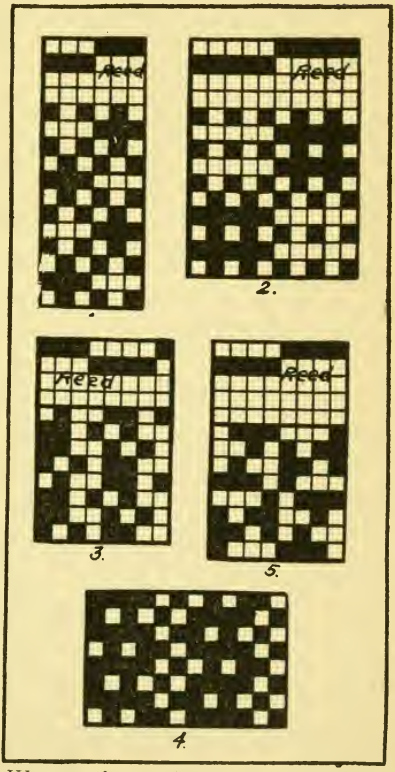
We take this occasion to acknowledge our indebtedness to the many contributors to TEXTILE WORLD, including manufacturers, superintendents, overseers and experts in mechanical and chemical lines. We also extend a hearty welcome to all those engaged in the textile industry who may wish to use the facilities of our organization for getting information on any problem whatsoever.

C. H.

Weaves for Imitation Knit Fabrics

I am after a few weaves to imitate knit fabrics that can be woven on a harness loom or jacquard loom, if necessary. Your help in this matter will be appreciated. (5484)

A few weaves for imitation knit fabrics are given herewith. The warp threads covered by each black strip at the top of the pattern (labeled "reed") are to be included in one dent. To make a more marked effect, weaves 1, 2, 3 and 5 can be reeded in as follows: 1 dent with the called for number of ends (3, 4 or 5), 1 dent skipped (no ends), 1 dent with ends, 1 dent skipped.



Weaves for Imitation Knit Fabrics

Equalizing Atmospheric Conditions

In certain departments of our mill the rooms are overheated and the air loaded with moisture, while in others it is too dry for the processes carried on within them. Is there any way of equalizing conditions as to temperature and humidity without complicated equipment? (5450)

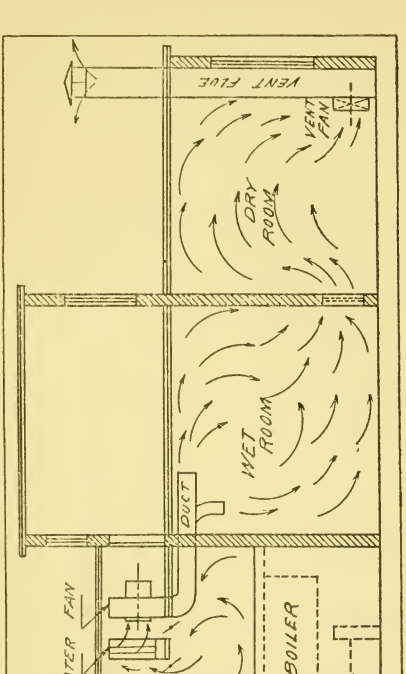
Whether or not this can be done to advantage depends a good deal upon the relative locations of the wet and dry sections of the building. If adjacent, or nearly so, it is often a simple matter to equalize atmospheric conditions to the advantage of both by means of fans and ducts for producing the exchange. A scheme for this purpose which was successfully carried out in a flax spinning mill is shown diagrammatically in the accompanying drawing. In this case, the relative locations of boiler room, wet spinning room and dry spinning room were such as to lend themselves admirably to the arrangement shown. Complaint was made of excessive heat in the boiler room, fogginess and dripping in the wet spinning room, and excessive dryness in the dry spinning room, which seriously interfered with the various processes carried on there.

The situation was treated as a whole by placing a heater and fan upon the roof of the boiler house and carrying up the wall over the boiler fronts to the ceiling so as to form an enclosed chamber including the heavy piping. Openings were made in the roof so that, when the fan was in motion, cold air would be drawn in and delivered near the boiler tops by means of a flue carried downward as shown. Warm air is drawn off from the upper part of the chamber, and that delivered to the fan maintained at a uniform temperature of 70 deg. by means of a thermostatically operated mixing damper which sends such proportions of the air through and around the heater as may be necessary to maintain this temperature. The introduction of a large volume of dry, warm air to the wet spinning room absorbs the moisture, clears the air of fog, and prevents dripping upon the employes and machinery.

The plenum, or slight air pressure produced by the fan, forces the warm moist air into the dry room through openings near the floor, from which it rises and is diffused throughout the room, being finally drawn off by means of an exhaust or vent fan, as shown.

For a large and rapid air movement, sufficient to absorb

all of the steam in the wet room, the duct arrangement shown in the drawing is desirable. If a smaller quantity of air is supplied, so that some steam still remains in the room, it will be better to admit the air near the floor and draw it off at the



Ventilation System for Equalizing Conditions

ceiling, or the reverse of that shown in the drawing. With this arrangement the air will be kept clear in the lower part of the wet room, and any steam present will be kept near the ceiling, where it will not interfere with the vision of the employes. Warm, moist air admitted in moderate quantities

to the upper part of the dry room spreads out near the ceiling, and becoming somewhat cooled, slowly falls to the floor and is carried off by the vent fan as shown in the drawing.

The volume of air required will vary with the quantity of moisture to be removed from the wet room. In the case mentioned, it was made equivalent to an entire change every four or five minutes. It is rather unusual for all three of these rooms to be located adjoining one another as in the case described, but if not too far apart they can easily be connected by means of ducts.

Exhaust Fans for Dyehouse Ventilation

In your issue of Dec. 6, 1924, we noted with some interest an article by Charles L. Hubbard, entitled "Ventilation of Dyehouses." Please refer to Fig. 5 of that article, showing special hood and exhaust fan. We would like to inquire what type of exhaust fan is contemplated in this installation, and if this is a direct motor driven fan, which we judge to be the case. What method of getting at the motor to oil it is contemplated? We would appreciate further information along this line. Also what size fan is used? (5289)

The arrangement referred to is shown diagrammatically in the drawing mentioned, as this is intended simply to illustrate the principle involved, rather than the practical construction. Either a standard propeller fan or centrifugal exhauster may be used for this purpose, according to which is most convenient. As the resistance to air flow is small, the former type will do the work satisfactorily, and can usually be installed by bolting a wooden frame, for supporting it, to the roof construction.

A direct-connected motor makes the most compact arrangement, but owing to the high percentage of moisture in the air to be handled, the motor must be enclosed in a waterproof casing. If preferred, a belted fan may be used, and the motor placed outside, although in this case it will be exposed to moist air in cases where considerable steam escapes into the room. Any inleakage of air, where the belt passes through the casing will do no harm, as it will simply furnish a small amount of general room ventilation.

The motor and fan must of course be accessible for inspection and oiling. Provision for this with a direct-connected

outfit, employing a propeller fan, is shown in Fig. 1. Instead of taking the exhaust pipe from the top of the hood, at the center, and going straight through the roof, the connection is made at an angle, which brings the motor to a point where

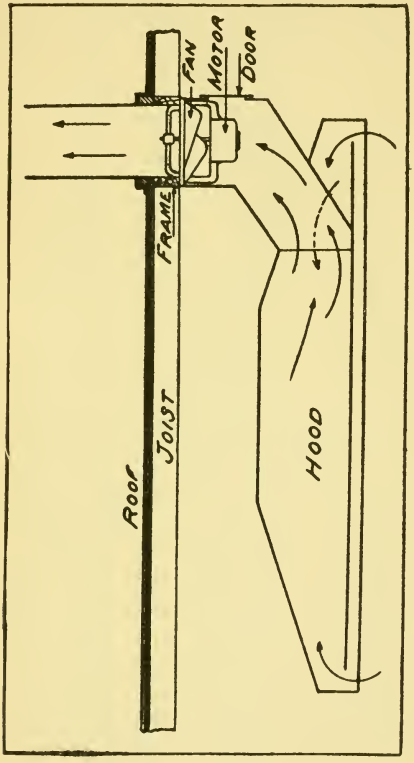


Fig. 1. Fan with Direct Connected Motor

it is easily reached by means of a ladder, a door of ample size being provided in the casing which encloses it. The duct is carried a short distance inside the hood, and opens towards the center, so as to equalize the air flow through the slot around the edge.

A scheme for using a centrifugal exhauster is shown in Fig. 2. This is hung from the roof construction at one side of the hood and connected with the top at the center, as shown. Either scheme should prove satisfactory.

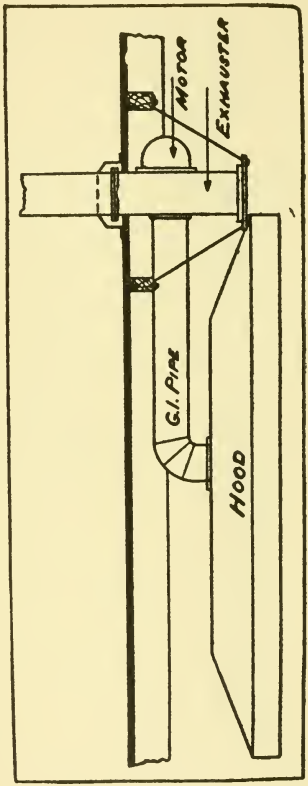


Fig. 2. A Centrifugal Exhauster

The size and speed of fan will of course depend upon the volume of air to be discharged per minute. A slot one inch in width and one foot in length will pass 50 cu. ft. per minute, from which it is a simple matter to compute the volume pass-

ing into a hood of this kind for any size and width of slot. When any given make of fan is to be used, it is best to submit the volume of air to be moved, together with a sketch of the duct arrangement, to the manufacturers, or their agents, and let them fix the size.

For approximate work, Tables I and II may be used. These do not apply to any particular make, but give average conservative results, and have been used in actual practice.

Table I

For Propeller Fans

Dia. Fan	R. P. M.	Cu. ft. air per min.
18 in.	950	1,500
24 in.	750	3,300
30 in.	600	5,100
36 in.	500	7,500
42 in.	400	9,000
48 in.	350	12,300

Table II

Single-Inlet Centrifugal Exhausters
(Multivane type)

Dia. Fan Wheel	R. P. M.	Cu. ft. air per min.
12 in.	1,350	1,800
15 in.	1,000	2,900
18 in.	900	4,200
24 in.	680	7,500
30 in.	550	11,500
36 in.	450	17,000
42 in.	400	23,000
48 in.	350	30,000

Advantages of the Bleeder Turbine

What are the advantages of the bleeder or extraction turbine over a non-condensing engine or turbine for textile mill work where the exhaust is largely utilized for heating and process work? (5415)

If the demand for low-pressure steam for heating and process work was uniform at all times throughout the year, and was furthermore just equal to the exhaust from the engine at constant load, the bleeder turbine would have no advantage over the non-condensing engine. As a matter of fact, the power load varies somewhat, although it is fairly constant in textile mills; but the demand for exhaust steam may vary from practically nothing at certain hours of the day in the summer, to a quantity exceeding that produced by the engine in the winter, when the heating system is on and process work is at a maximum.

The demand for steam for heating varies from hour to hour and day to day throughout the season, while that required for dyeing, washing, drying, etc., fluctuates between wide limits during different parts of the day. This condition naturally results in the waste of large quantities of steam, to say nothing of the inefficiency of passing high-pressure steam through a reducing valve to make up the deficiency of exhaust from time to time.

The advantage of the bleeder turbine lies in the fact that just the right quantity of exhaust from the high-pressure element may be withdrawn to meet the heating and process requirements. There is never any surplus exhaust to be discharged outboard, and all low-pressure steam used has first passed through the high-pressure element and produced useful work in the process of pressure reduction instead of being "wire drawn" through a reducing valve.

The automatic action of the bleeder turbine is illustrated in the accompanying diagram. This of course shows simply the general principle, and is not intended to represent the actual arrangement, as details of designs vary widely in different makes. This machine, in effect, consists of a high-pressure turbine and a low-pressure turbine, the rotors of which are mounted upon the same shaft. The exhaust from the first of these passes into the heating main, which has a branch connection, through relief valve "A," with the steam supply chamber to the low-pressure turbine.

Let us first assume that the power generated by the high-pressure element plus that generated by the surplus exhaust passing through the low-pressure element, when the demands for heating are at a maximum, is equal to the full load required of the turbine. Let the relief valve "A" be set, for

example, to maintain a pressure of 5 lbs. gauge upon the heating system. Any surplus exhaust above that required for heating purposes will tend to raise the pressure, which in turn will open the relief valve "A" and allow the surplus to pass

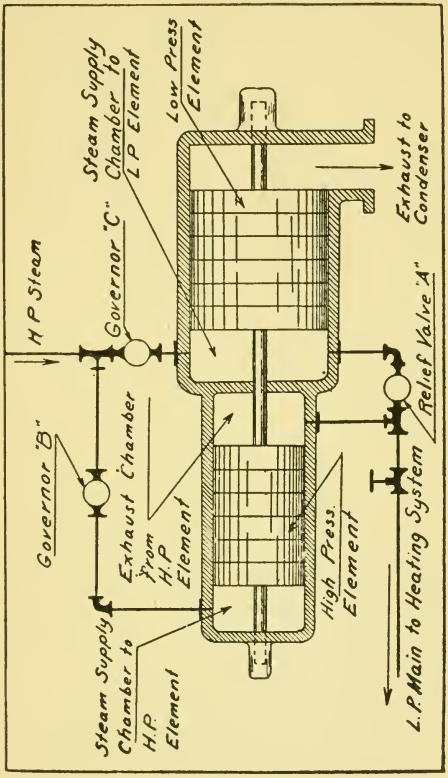

H P Steam
Governor "C"
Steam Supply Chamber to L P Element
Low Press Element
Exhaust to Condenser
Relief Valve "A"
Governor "B"
Exhaust Chamber from H P Element
High Press. Element
Steam Supply Chamber to H P Element
L. P. Main to Heating System

Diagram Illustrating Action of a Bleeder Turbine

to the low-pressure element, where it is expanded down to condenser pressure, thus generating power which is added to that of the high-pressure element.

As the heating requirements become less, and more exhaust steam passes from the high-pressure to the low-pressure ele-

ment, more power will be developed, and the turbine will tend to speed up at constant load. The effect of this is to close the governor valve "B," thus reducing the quantity of boiler steam supplied to the high-pressure element. It has been assumed in the illustration that the high-pressure element is designed to carry the full load with the assistance of the low-pressure element when the surplus exhaust from the former is at a minimum. As this condition might hold for only short periods, while the demand for heating and process work was at a maximum, it is customary to design the turbine for normal conditions. Then, when the surplus exhaust falls short of that necessary to generate the required power in the low-pressure element, and the machine begins to slow down, live steam is admitted through the governor valve "C," thus making up the deficiency. Sometimes the live steam is admitted directly to the low-pressure element through special nozzles instead of being mixed with the exhaust from the high-pressure element in the supply chamber, as shown in the diagram.

When steam is admitted through a reducing valve the efficiency is lower than when it is first expanded in the high-pressure element, hence, a bleeder turbine should be especially designed and adjusted for the special conditions under which it is to operate in order to secure the highest economy.

Variables in Caustic Liquor

In connection with our caustic recovery plant run in conjunction with the mercerizing process, we are continually being called upon for data regarding variables in the caustic liquor. Three problems stated as follows occur most frequently:

(1) What is the relation of degree Twaddle change to temperature change within these limits: 50 deg. F. to 212 deg. F. of 55 deg. Tw. to 165 deg. Tw.?

(2) What conversion tables are available for weights of caustic liquor corresponding to Twaddle, say at 50 deg. F.?

(3) What tables are available for converting any degree Twaddle caustic liquor into terms of 74% solid caustic?

(5281)

As far as we know, there have been published no tables giving exactly the information desired. The following data which has been compiled and adapted for the most part from bulletins issued by the Solvay Process Company should, however, be satisfactory.

Fig. 1 is a chart showing the relation of degrees Twaddle change to degrees Farenheit change at various concentrations and temperatures. Fig. 2 is a table for converting caustic

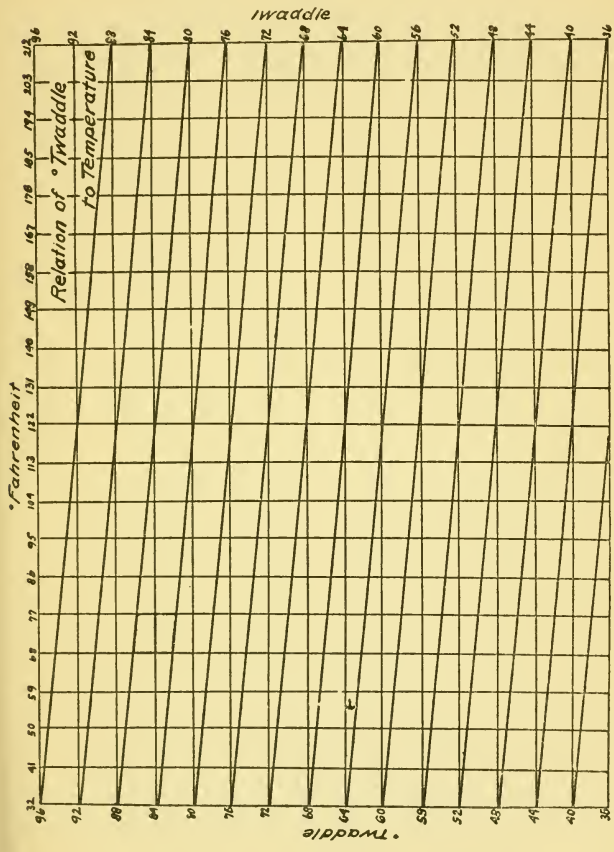


Fig. 1. Relation of Degrees Twaddle to Degrees Fahrenheit

liquor from degrees Twaddle to terms of pure caustic, or of 74% solid caustic. The figures given, while not scientifically accurate, should be sufficiently close for plant practice. Impuri-

ties in the solution would influence the results, and for exact results chemical titration should be employed.

Conversion Table for Caustic Soda
At 60° F.

Specific Gravity	Degrees Twaddle	Percent Caustic (NaOH)	Percent 74% Caustic
1.14	28	12.5	13.0
1.16	32	14.5	15.0
1.18	36	16.0	16.5
1.20	40	17.5	18.5
1.22	44	20.0	21.0
1.24	48	21.5	22.5
1.26	52	23.5	24.5
1.28	56	25.0	26.0
1.30	60	27.0	28.5
1.32	64	29.0	30.5
1.34	68	31.0	32.5
1.36	72	33.0	34.5
1.38	76	35.0	36.5
1.40	80	36.5	38.0
1.42	84	38.5	40.5
1.44	88	40.0	42.0
1.46	92	42.0	44.0
1.48	96	44.0	46.0
1.50	100	46.0	48.0
1.52	104	48.0	50.0
1.53	106	49.0	51.0

Fig. 2. Conversion Table for Caustic Soda at 60 deg. F.

Slack Selvage in Weaving

We are weaving a piece of cloth with 112 threads per inch and 60 picks per inch, a sample of which I am sending you herewith. These goods are being woven on a 44 in. loom. We are having considerable trouble with the selvage running slack. We have tried doubling the selvage in the harness and reed and we get a curled-up selvage. We have also tried a tape selvage and the threads get so slack that the drop wires stop off the loom. We then put four threads in each of the four outside

dents, and added one thread to each dent until we reached eight threads to each dent in the slasher comb, which was as follows: 4-4-4-4-5-6-7-8. This helped some. The first warps we made to run on our 44 in. looms, and the selvage would become so slack that it would not run. The loom beams on our 44 in. looms are 48 in. between heads, and the cloth woven is 37 in. wide. Will putting fewer threads per dent in the slasher comb at the selvage on the slasher help to overcome the trouble? We would appreciate your advising us the best method of laying the selvage on the slasher; also the best method of reeding same on loom. (5299)

Upon examining the sample of cloth we find that it contains 48 ends of single yarn in the selvage. The body of the cloth is drawn one end in the harness and woven one end up and one end down, or plain weave. The selvage appears to be drawn two ends in the harness eye and is woven two picks up and two picks down.

If the inquirer will study the plain and selvage weaves closely, we think he will be able to see why the selvage weaves slack. The ground or body of the warp interlaces at every pick, while the selvage interlaces every two picks. Therefore, the ground will weave in faster than the selvage, causing the selvage to become slack. The weight of the drop wire takes the slack until it drops low enough to come in contact with the stop motion, which stops the loom. Putting fewer ends in the selvage at the slasher comb will not give the desired results. The selvage should be laid in the slasher comb so that there will be no more yarn in a dent than there is in the rest of the comb. The inquirer states that he is dressing these warps on beams 48 in. between heads, and pulling down to 37 in. woven. We think this is expecting rather too much from the yarn; 42 in. between heads should be ample.

Let us suggest that the inquirer have some of his yarn twisted two-ply and put 24 ends on a side. This will equal 48 single ends. Skip these ends under the squeeze rolls in the size box, so they will pick up just a little size, and lay them in the slasher comb one ply end for two single ends in a dent in the rest of the warp. By this we mean if you put eight single ends in a dent in the body of the warp, the selvage should be put in four ends in a dent. Draw the selvage one ply end in one harness eye and three or four eyes in a dent in the reed,

whichever proves most satisfactory. Then weave the selvage plain, same as the ground or body of the warp. This we think will overcome your trouble with slack selvage.

Should Silk Be Steamed Before Quilling?

We are using three-thread Japan, 8 turns per inch. Should it be steamed before being quilled? (5699)

The inquired does not state what the raw silk size is. Naturally, a very coarse size of raw silk will induce greater contraction, or tendency to flink, than in finer sizes. I shall take it for granted, however, that he uses the 13/15 denier size silk. He also does not state whether the yarn is in the gum, or has been dyed, but I shall assume that it was in the gum.

My opinion is that there could be no necessity for steaming the material for quilling if it is properly handled. In winding and quilling, the yarn should be kept under good tension, and in the weaving also there should be a fair drag on the thread as it leaves the shuttle. If this is done, I think any slight tendency of the thread to kink will be quite overcome.

Weak Places in Bleached Yarn

We are having a lot of trouble with our bleached skein yarn. We bleach a good quality of 1/30s combed peeler and will endeavor to describe our process and would like to know if you can explain our trouble. We boil our skein yarn in kiers with webbing in a 3% solution of caustic soda, then rinse in kier with cold water, then take yarn in a very weak solution of chloride of lime, so weak that it will not twaddle. Then the yarn goes into a sour bath, very weak solution, then rinse in three clean waters. In order to get our yarn pure white, which our trade demands, we use no bluing. Our trouble is that we find weak spots in our yarn. Some batches go through all right but other batches have occasional skeins of weak yarn. We can't find any traces of lime or acid after the bleach. Any information you can give us in regard to this condition would be greatly appreciated. (5287)

It is recommended that the inquirer be careful with the operation of his kier. This is the only cause which we can see for the damage mentioned. It is rather difficult for one who is not actually in touch with the bleaching process to put his finger on the trouble, as the type of kier and other details are

not mentioned. However, the damage may result from three faults:

1. The yarn may touch the side of a metal kier before it has been properly cooled and still contains caustic soda.

2. Strong caustic liquor may have been introduced into the kier when charging and the tendering may be a slight caustic burn.

3. If the kier is a closed type or pressure kier, care should be taken to see that all air is expelled before pressure is allowed to accumulate.

The writer can see no fault with the inquirer's actual chemical process and tender yarn should not result from the treatment given if the kier is properly manipulated.

Drag in Cap Spinning

I wish to ask how I can increase the drag on a cap spinning frame? The spindle rail is thirteen inches from the bottom of the beam. I shall appreciate any aid you may offer. (5294)

Drag or winding tension on a cap spinning frame is affected by the following factors:

(1) R.P.M. of bobbins.

(2) Distance of cap from rollers. This distance is always measured from the edge or lip of the cap.

(3) Diameter of cap. (Larger, more drag.)

(4) Diameter of bobbin. (Smaller, more drag.)

(5) The speed of the bobbin rail, controlled by the speed of heart cam, also slightly affects the drag when rail is moving in one direction.

Bobbin speed determines the production, consequently all yarns are spun with the highest speed that will produce a satisfactory yarn and a good spin. Too high speed generally produces a rougher yarn, especially for soft twists, or yarns produced from the coarser wools or mohair. Where smoothness is essential or luster is a desirable feature, low bobbin speeds are an advantage. When spinning to the limit, high bobbin speeds give too much drag and so breakages are excessive; in this case reducing the speed of the bobbin or spindle reduces the drag.

If, when using the highest possible bobbin speed on a cap frame, the drag is not enough, thus producing a soft bobbin

and excessive kinks in yarn every time the frame is stopped and started again, either the spindle rail must be lowered or a larger cap be used. A longer cap gives the same result as lowering the spindle rail.

We would suggest that you first determine whether the bobbin speed can be increased. This, if found feasible, will give more drag and more production and also a rougher yarn, with probably not so good a spin. If this is not possible you must lower your rail, unless the length of spindles will permit you to use a longer cap. The use of a longer cap would enable a longer bobbin to be used, providing your tubes are long enough, resulting in less doffing.

Spots on Dyed Stockings

I am enclosing a stocking which has been dyed and which has developed spots. These spots do not show up until after the goods have been boarded and have laid around for a while. They are not there, or at least are not visible, immediately after boarding but seem to show up after they have been packed and have been in storage for a while. I would like to know if you can give me the reason for such spots developing and perhaps a suggestion as to how we may overcome them. We have noticed this on one other shade up to the present time. I would also like to know if it might be caused by mold. The stockings of course are dried thoroughly, but we thought they might have a little water or small spots of paste dropped on them which would cause them to mold. I would appreciate any information you might be able to give me concerning these spots and any suggestions as to how we might overcome them. I might say that we use practically the same colors to dye this shade that we use on all our other shades, and we seem to have no trouble like this on the rest of the colors. (5290)

These spots are not the result of mildew, but give every indication of having been caused by an acid that has been splashed against them. Your suggestion as to their origin being due to drops of paste is interesting, and this may be the direct cause. Many commercial pastes have weak organic acids and other ingredients added, such as antiseptics, to prevent the formation of mildew (mold) but which are quite active on light shades, especially when stored. It might be well to have the paste analyzed.

Chattering Rolls on Spinning Frame

Kindly explain the reason for chattering rollers in a worsted spinning frame. I have particular trouble with new frames, though it happens once in a while with old ones. The grease I am using for lubrication keeps the roller necks covered with a good film and in a perfectly cool condition. Another lubricant that I have tried keeps the roller neck dry and hot, usually, if not changed very often and the rollers chatter then very badly. Do you think that chattering rollers affect the quality of the yarn in any way? (5438)

Chattering or excessive vibration of the rollers in a spinning frame may be caused by:

(1) Rollers out of line
(2) Tight bearings
(3) Dry bearings
(4) Excessive pressure
(5) Poor lubrication:—(a) lack of oil; (b) poor lubricant.

New frames always give more trouble in this respect until they have run for a few months. For new frames it is advisable to use a high grade tallow and, in addition, to oil bearings twice daily with a heavy mineral oil. Tallow is also good for old spinning frames. Lubricants should be purchased according to their suitability and efficiency. The best is really the cheapest. Chattering rollers will naturally result in a less even yarn being made on account of the interference with the regular drafting action.

Defects in Weaving Crepe de Chine

I am enclosing two samples of crepe de chine which I trust you will look over, and if possible give me the remedy for the defects. You will notice that these pieces are very rough, and I wondered if our warps were slack or if something was catching on to the filling which makes the piece puckered up in this manner. You will also notice that on one piece there is a light wavy mark where the weaver had picked out and started over again, leaving this light wave when it was again woven. We have experienced at times some strips that seem to be heavy and then light, but which do not show under the pick glass. Any information that you can give me in regard to the manufacture of this class of goods will be greatly appreciated. (5298)

The undyed crepe de chine, submitted as being objectionably rough, appears to have a warp construction of 58/2/2, equal to 232 ends per inch of 20/22 denier white Japan raw silk, and 84 picks of about four-thread crepe de chine twist for the filling. It is woven, of course, in the usual plain weave. Throughout, it has a rough "hand," and the surface appears to be covered with what might be termed "blisters," or local raised places of limited area, say ¼ to ⅜ of an inch in diameter, closely distributed all over the piece. The inquirer, in my judgment, is right in assuming that there has been insufficient weight on the warp beam. This warp material is hard and unyielding, and consequently requires to be woven under a heavy tension. If sufficient tension cannot be got with the usual hang weights, it is desirable to use levers with weights at each end of the warp beam. It is also useful to use plenty of beaming paper, putting in a sheet every three or four or five yards, so that all the warp threads will be held as true and even as possible.

Another factor which may help to cause the blistered effect is the closing of the shed too early. When the warp threads are nearly closed as the reed is beating up the filling pick, its progress into the cloth is obstructed and it has to be pushed in against the resistance of the warp threads. Where these threads happen to run finer, locally, it will push its way home, but where they are thicker and more resistant, it may not go all the way home at such places, and will spring back slightly when the reed goes back. That this cause has been operating here seems to me very likely, in view of the fact that the filling threads, when carefully observed under the counting glass, will be found not to be true and straight as they run across the piece, but they curve inward and outward slightly for short distances along the length of the thread, thus making the spacings unequal.

It is also desirable that when the harnesses are strapped in, and aligned, with due relation to the height of the top of the whip roller, and the fell, or weaving edge, of the cloth, that the harnesses which are down should keep the warp threads about as far below the line as the raised threads are above it.

Where the crepe filling has not been well steamed, it will have a tendency to contract locally, or curl slightly, though not to the extent of kinking. It should be seen to that the filling

is very well steamed so that the threads will lie true and regular in the shed.

Another point that should receive attention is to see that the tension of the two shuttles used is absolutely the same, so that each successive pair of picks will not be tighter than the alternating pair. Puckering can be very readily caused by unequal shuttle tension. If the extreme edge of the cloth at the outside of the selvage is examined, it will be noticed that at one edge it is quite rough and irregular, strongly suggestive of an inequality of pull, by the shuttles, on the right and left-hand twist threads respectively. If the inquirer will investigate this difficulty along the lines suggested, he will no doubt find the remedy for the defect.

In the other sample to which reference is made in the inquiry, the wavy mark referred to is an irregular displacement of the warp threads for a length of some four inches and a couple of inches in depth. The major portion of this lies at one side of the starting line, this line being indicated by a fine, short projecting filling pick. But there is also some of this distortion on the other side of this pick, about five-eighths of an inch from it, and continuing for about three-eighths of an inch. This, in my judgment, is due entirely to the carelessness of the weaver in picking out. This is only local and does not extend across the piece. It seems as if the weaver, in his picking out, had stretched the warp threads heavily at this place, so that when released from the tension they would not spring back into their original groupings and regular levelness. This damage is of a kind that should not occur again, but of course if it is a constantly recurring defect, and if there are any other features concerning it that require investigation, it might be worth while going more deeply into its cause.

JAMES CHITTICK.

The following comment was sent in by a reader: Having read with interest Question 5298, in the January 24 issue of TEXTILE WORLD, I would be glad to offer you what I think may be the remedy for the wavy marks in the weaving of crepe de chine. The inquirer will discover that his weavers find the broken picks with finger and thumb. They should be found with the point end of a pair of pickers, but the point should be very blunt so as not to damage the warp. I would

also suggest that the inquirer see that the brushes are set properly in the shuttles. If not, they tend to make a rough weave. W. Hey.

Yellow Streaks in Silk Underwear Fabric

We are enclosing herewith a piece of all-silk circular underwear cloth which has been dyed with Rhodamine in a fresh soap liquor and finished with jersey cloth finish. These goods were carefully inspected after finishing and were found to be satisfactory throughout. After they had laid for about a period of two weeks, upon re-examination we find the yellow streaks to be present, such as appear on the sample enclosed. We would appreciate any method that you can suggest to remove these stains, and if it is possible to give us an analysis of them we would like to know what you believe has caused this result. (5392)

The brownish stains appearing on these goods have been carefully identified as being due to iron. Just how this iron has gotten on your pieces, it is beyond us to say; perhaps if the course of these goods through your mill is followed with care you may locate the trouble. From their appearance it seems not unlikely that the goods have rubbed against some machine or truck that was wet, either with water or some diluted acid, which caused the metal to rust. This is only an opinion that is ventured in this instance, since there have occurred cases where just such conditions existed.

As to the removal of these stains, we suggest that the goods be given a thorough washing with water to remove whatever will come out with water, and then carefully work the goods in very dilute muriatic acid. This acid will dissolve the iron rust which is the actual stain. Afterwards rinse so well that no traces of acid remain. Then the goods can be redyed. In carrying out this suggestion, every care is to be exercised so as to preserve the quality of the fabric. Do not overwork the goods, and above all, give plenty of time for the operation, especially during the washing.

Finishing Printed Sateen

I am enclosing small sample of printed sateen and would welcome any information through the Question and Answer page as to the best methods to adopt to procure a finish to match sample; also the machinery required. (5302)

The sample is a very well executed backfilled finish on printed sateen. After printing, soaping and drying up for finishing, these goods should be run over a range consisting of tommy dodd, or backfilling mangle, 20 ft. tenter, and the number of cans necessary to dry the production required. As a rule these ranges have thirty-one cylinders. The writer would say that a mixture of the following ingredients should give approximately the finish required:

60 lbs. of corn starch.
40 lbs. of white corn dextrin.
40 lbs. of talc.
3 gals of 50% turkey red oil, or otherwise about
25 lbs.of high grade white tallow softener.

Cook to make 100 gallons of starching liquor. After filling with this mixture on the back of the goods, on the tommy dodd mangle, and the tentering and drying over the range, the cloth should be conditioned and passed over a 5-roll calender with three cotton or combination rolls and two heated chilled iron rolls. The goods should then be ready for folding or putting up.

Temperature of Card and Spinning Rooms

Please inform me of the correct temperature to keep the card room and the spinning room. We have been trying a new wool oil and find that it gums the cards. I though perhaps the temperature of the room was too low. It is about 68, and sometimes lower. (5305)

The following information on suitable atmospheric conditions for wool carding and spinning, which is taken from the new book "Air Conditioning in Textile Mills," by Albert W. Thompson, vice president of the Parks-Cramer Co., indicates the best practice:

A temperature of from 75 to 80 deg. is most desirable (in card room) for preserving the fluid condition of the oils carried by the fibre, avoiding the sticky condition which results if the temperature is too low. Relative humidities of from 65% to 70% are also desirable to retard properly the drying out of the material. Difficulty in starting up after shut downs may be prevented by operating the humidifying system for an hour or two in advance of starting time, and then starting up the cards on stock newly received from the picker room.

Before discussing atmospheric moisture in the spinning room, let it be thoroughly understood that the spinning operation depends largely for its success upon a proper atmosphere in the carding room. In general, the relative humidity in the spinning room should be about 10% lower than in the card room, i. e., about 55% to 60% relative humidity. The temperature should be about the same as that of the card room, 75 to 80 deg., and for the same reasons. Obviously to maintain the humidity, artificial humidification will be necessary during the winter months when outside air is cold and dry, resulting in a pronounced deficit of moisture in the artificially heated factory. In ordinary pleasant summer weather, the humidifiers will also prove useful. Extremely humid dog-day weather sometimes produces too high a humidity, and at such times it becomes necessary to increase further an already high temperature by heating to lower relative humidity.

(The reader should on no account confuse the recommendations for practice and the conditions described here with practice in worsted manufacture.)

Degreasing Belting

What method is employed by mills for extracting surplus oil from leather belts? (5436)

Grease and oil can be removed from leather belting by immersing the belt in gasoline or naphtha and letting it remain over night, or for a shorter or longer period of time as may be found necessary. Belts so treated will be very harsh and dry, and will have to be re-oiled before being used again. There is of course considearble hazard connected with this practice, as in all cases where volatile solvents are used. There is not only the danger from fire, but also from the possibility of a spark caused by static electricity, which may occur in spite of all precaution, as in pouring the liquid from one container to another.

If the belts are large it would be advisable to send them to a firm that makes a specialty of extracting and degreasing such material, and who will take all the risk. It is very probable that in the plants of such concerns the belts are placed in closed kiers, and first subjected to a vacuum which removes all the air from within the pores of the belt, which in turn

will facilitate the entrance of the solvent, resulting in a better degreasing. The solvent is then distilled and recovered, and possibly the grease sold also.

Winding Dyed Yarn in Lace Industry

We are looking for information regarding the winding of dyed yarn in the lace industry. Is there anyone in your organization who is familiar with the processes and can advise us in regard to them? (5296)

By far the larger part of the lace manufacturer is made from undyed yarns and the material colored in the web. It is somewhat difficult to answer the inquiry, inasmuch as there are a number of branches of the lace industry. For instance, there is the Levers lace machine which produces imitations of all the hand-made pillow laces. There is the steel bar warp lace machine which produces the coarser grades, such as crotchet edgings and the like. There is the string warp lace machine, producing what is termed church laces and curtains. There is also the flat bar warp machine which produces many kinds of knitted laces, both in narrow breadths and pieces.

Then there is the lace curtain machine which produces window curtains, breadths of laces any width, and also all-over laces for dresses and various other uses. There is also a lace machine introduced a few years ago, built on the lines of a tape making machine, which makes very beautiful laces in single breadths, much resembling the Torchon laces made on the Levers machine.

Which of the foregoing classes does the inquirer refer to? All-cotton lace that is intended to be all one color would be manufactured from the undyed yarn and dyed afterwards. In the case of a lace pattern embodying a variety of colors, such colors would of course be skein-dyed. In the case of the Levers machine, there is sometimes one warp and sometimes two warps, with an addition of upwards of one hundred beams, each wound or warped separately. If any of the beams carried colored threads, such colored threads would be skein dyed and then wound on to bobbins for the warper to wind on to the warping mill, after which he transfers the threads from the warping mill to the beams or warps.

There is also in the Levers lace trade, and also in the lace curtain trade, what is known as a brass bobbin. This is made

by riveting together three flat round discs of thin brass plate; a small disc in the center and a larger one on each side of the smaller one. The finished brass bobbin is about 1¾ in. in diameter and from 1/32 in. to 1/16 in. in thickness. These bobbins carry one thread only and are located in thin steel carriages which pass to and fro through the warp and beam threads, locking or twisting the lace pattern together.

A string warp machine possesses a spool board, as also does the lace curtain machine, from which the threads are carried direct from the spools into the machine. These spools are wound on a spool winding machine from the skeins in a very similar manner to an ordinary winding frame.

Colored yarns, if any, would, of course, be skein dyed. In all cases, in the lace industry, the yarn must be wound off the skein or cops on to bobbins or spools, for the warps, beams or spool boards, as the case may be.

A practical mill man replies to the inquiry as follows: Replying to your inquiry in regard to winding of yarn in lace weaving, I would state that there are three ways:

(1) For bobbins, 60/1 to 180/2 cotton or silk is mostly used, which is wound from skeins to spools and from spools to bobbins. The bobbins are steamed and pressed and loaded in bobbin carriages.

(2) For fine laces, head-beams are used; usually 60/1 to 180/2 cotton or silk is wound from skeins to spools, from spools to reels and from reels to head-beams.

(3) For laces where thick threads are used to outline the objects, independent beams are used in combination with head-beams. For heavier laces, like Torchons, Clunys, etc., independent beams are used only, with 80/2 to 10/2. Independent beams are wound from skeins to spools and from spools to beams. The finished web is then dyed. Only in laces where threads outline or relief objects is the yarn dyed in skeins. The foregoing method applies to Levers laces only.

The following is from a large manufacturer of laces: In the lace trade, the fine cotton yarns are usually dyed in the web, after the goods are manufactured. We imagine that at least 95% are treated in this manner, as we are never sure from week to week as to prevailing fashions in color. We frequently find that the manufacturers of underwear and other garments to which lace is applied prefer to have us dye to the shade of cloth on which they are working at the time, and on

that account we keep our goods in the undyed web, until special instructions are received from our customers.

Whenever we receive instructions to make laces with mixed colors, the yarn always has to be dyed in the skein, after which there is no difficulty in winding or warping. Our mode of procedure is as follows: Yarn, either dyed or otherwise, is wound on tubes on the Foster machine or on the double-ended spools on the drum winder. For beaming or warping this can always be done direct from spools, and it is not necessary to rewind on to any other reel before doing so. When using a dyed yarn on the brass bobbins, as used in the lace machine, we frequently find there is some difficulty in placing the thread in the bobbin on account of a roughness to the feel of the yarn which generally takes place in the process of dyeing. When the brass bobbins are wound and pressed, great care should be taken with them when placed in the steam oven. Personally, I think it is better, if possible, to do without steam altogether.

Spinning and Doubling in One Operation

The writer would like to ask through the columns of your very valuable paper, if in the past there has ever been in use a system by which a worsted or cotton yarn was spun and twisted on one machine. What I mean is the yarn to be spun in the single as usual, then two single threads twisted together on the same machine as in one operation, instead of two as is generally applied. If there has, will you please put me in communication with the people as I would like to obtain all possible information on the subject. I want to thank you for your kind and willing cooperation in the past, and also thank you in advance for any help that you may now give me. (5447)

We believe that the inquirer refers to the "Forrest System," brought out in 1923 by Saco-Lowell Shops and offered to the worsted trade. It was described in the March 3, 1923, issue of TEXTILE WORLD. This system permits the blending of stock upon the spinning frame, thereby effecting economies in raw material cost, as well as eliminating the twisting operation. It is a process whereby a mill may blend two rovings, differing in size and differing widely in length and quality of fibre, drafting each according to its characteristics, then spinning and doubling the two together on one spindle, producing a yarn which may be used in any fabric calling for a two-ply

yarn. The regular practice now in use regarding draft and ratch is followed in the Forrest System, but all the rovings do not pass through the same combination of back and carrier rolls.

Moisture Content of Wool

From time to time we buy more or less scoured wool. Of late, we have redryed several lots and found them to contain what we believe to be an excessive amount of moisture. I am writing to ask you if you can advise us if there is any accepted standard for the moisture content of scoured wool, or if not, what would be considered a reasonable percentage? (5300)

No American standards for moisture content of textile materials have been established by legislative action. However, 8½% for cotton yarns, and 11% for silk yarns, have been recognized officially in the administration of the tariff. The National Association of Wool Manufacturers has accepted 15% as the proper regain standard for tops in the United States, and the National Association of Cotton Manufacturers passed a resolution in 1916 recommending the adoption of 8½% as the standard regain for baled cotton and cotton yarn. In the case of scoured wool, American practice is to consider 16% or 17% (which are established standards for wool in Europe) as a reasonable moisture content.

Finishing Cotton and Wool Mixed Goods

Enclosed find sample of cloth just from the loom. I desire to give this piece the best finish that is possible, to make it feel soft and smooth. It is to be 30 in. finished. Could you inform me as to the correct procedure to obtain what I want? The mix is 30% comber cotton and 70% carbonized wool waste and shoddy, spun to 12 cut. (5317)

Knowing the width to be finished, without a knowledge of the width from the loom, makes it somewhat difficult to give definite details as to the procedure required. We suppose that it is desired to secure a finish somewhat similar to that of a worsted fabric of about the same pattern. In that case the amount of fulling might be right, or if excessive it might defeat the object sought, by producing a too boardy or felted effect. On the supposition that the construction in the loom is correct, we would advise the following procedure:

Burl carefully and sew in all missing fancy threads. The soap for fulling should be of sufficient alkaline strength to thoroughly saponify all the grease contained in the stock and of a consistency produced by not less than 5½ oz. of good fulling soap to the gallon of mixture. This should be boiled at least three hours after being dissolved, and allowed to cool before using. Run the cloth double in the fulling mills, and apply the soap very slowly, so as to secure a uniform moisture. Apply a sufficient quantity so that it will come from the cloth freely when wrung by the hands; but not enough to throw off in passing through the rollers, or to create any appearance of a lather on the surface of the cloth. Full to the width desired and pass on to the washers as soon as possible, as at this point quick handling is very important, both for the cleansing and the clear effect of the fancy threads.

Start in the washer by opening the gates and rinsing off with warm water (not hot) about 5 or 10 minutes to get rid of most of the foreign matter loosened up by fulling. Now close the gates and apply enough of the same soap used for fulling to create a good lather. Run 20 to 30 minutes and then rinse off with warm water until the lather disappears; follow with cold water for 30 minutes. Extract and dry promptly. Never let the goods remain wet at any point any longer than is absolutely necessary.

In shearing, set the blades and run a sufficient number of times to brush up all loose fibres and produce a clear effect of the pattern. But avoid getting close enough to "scrape" the thready face of the cloth. After careful specking, brush and give a hard pressure with the face of the cloth down. If too stiff or glazed on the face, a light steaming may be given, but this should be done very carefully so as to avoid removing from the body of the cloth the effect of the pressure attained.

Handling of Materials and Supplies

We would appreciate any suggestions you can give us on the development of a system for the handling of and accounting for materials and supplies in our stock room. (5432)

There are three distinct types of organization, as it pertains to the handling of materials and supplies. One is the old disorganized type which has just "grown up." In it you will find the storeroom without any special system of control.

The second is that type which has discovered many wastes due to its unorganized condition. The management has taken steps to check them. In this type the storerooms are carefully looked after; separate departments and office force being provided for, and the authority of the persons in control of accounting and purchasing is clearly defined in relation to the stores department. All material is carefully classified, definitely located and guarded by a proper system of requisitions, records and inventories.

The third type includes those which have adopted the scientific management system. In this type we will find that the material is not only guarded by systematic accounting, but a special clerk is provided to keep a balance of stores record. This clerk, being located in the planning office from which come all orders pertaining to stores, can tell at a glance by means of his records and location chart, the status of any material and where it can be found.

In addition to systematized methods, modern management requires that not only the material for work, but all materials and supplies used in the plant, shall be controlled by the authority of the general stores department. It is not sufficient, under scientific management, to send a requisition to the stores for needed materials. All orders which require materials must go through the balance of stores clerk's hands before they are honored. He examines all items and assigns them to a specific order.

After being thus assigned this material is not available for other orders which may follow. This is done before the materials are required for use, and serves as an advance notice to the stores clerk of any unexpected demand for a particular material. This makes it possible to renew supplies on short notice. The planning department plans out the movement of the material from the stores department to any particular place where it is needed. It provides for the return of material as partly finished or finished product.

Knitting Worsted Yarns

The enclosed sample was made on a 12 cut Lamb machine. We use this fabric for making men's sport coats and ladies' suits and dresses, and the goods are fashioned to shape in the knitting so that there is little waste. We have had some

trouble with these goods, for the reason that the yarn is sometimes irregular, sometimes it is tender and sometimes it will catch on the cone. In any of these cases it usually causes a hole in the fabric. We have made a device to catch the knots so that we can watch them, and we therefore have little trouble on that account.

If we use the finer counts it costs us a great deal to produce the material, as the price begins to rise quite fast when we buy a finer yarn than a 2/30s. We use two ends of French spun 1/30s for making underwear on these machines, and we are wondering if the sweaters could be made out of the one-ply yarns. We could use a circular machine, but the trouble with this machine is that we would have to have a number of them in order to make the different sizes, and we do not have production enough to make this pay. (5309)

It is not really practical to knit a 2/30s worsted on a 12 cut Lamb machine. This size would be more appropriate for an 8 cut, or not finer than 9 cut machine. Another thing we note is that you are knitting off cones, presumably wound by someone outside. Such winding may not be well done. It is considered that good winding is half of good knitting, and many men believe that it should always be done under the immediate supervision of the person responsible for the knitting. The knitting qualities of any worsted yarn are also improved by waxing it in the winding process. As to using two threads of single 30s, you could use these no doubt but the fabric would not have the same appearance as when made from 2-ply yarns. To sum up, we think you will get satisfactory results if you wind your own yarn, preferably on bottle bobbins, and knit it on an 8 or 9 cut machine; that is, if it is a flat or Lamb type machine.

Weighting with Acetate of Lead

Will you be so kind as to give me the process of weighting crepe de chine with acetate of lead? Is it done in the dyeing or in the finishing? (5306)

Weighting of crepe de chine with acetate of lead is done in the finishing of the piece. After the piece is dyed and washed, it is extracted and placed in a bath of acetate of lead, a standing liquor of 5 deg. Be., for half an hour. The piece is wrung out of the bath, not washed, then extracted and dried on the frames.

Wool Carding and Spinning Difficulty

We are having a lot of trouble in making our 5 run work go, and of course everything is put up to the carder. I maintain that the stock is not fit, being too coarse; also that the stock is not picked or blended in the right shape. I am making roving 84 grs. 50 yards, and have trouble in coming off spools. When I make roving 87 grs. they fall down like rain on the mule. The spinner has tried out everything he knows and still we are getting no results. We have 14 sets here, 7 are 40 in. and 7 are 48 in. Eleven sets have rub roll condenser and the other 3 have Barker. We also have trouble in holding the cards to weight. They will jump from 1 to 8 grs. Under separate cover you will find sample of stock and roving. Will also state that all our wools are pulled wools. We have no duster or willow and do not burr pick any stock. Wool is taken from bags, dyed and dried, then run through mixing picker and carried to bins by blower. You will find stock and roving numbered so you can give us an idea of our trouble. I trust you will give me a solution for these troubles. (5297)

The chief difficulty seems to arise from a lack of proper preparation of the stock previous to carding. The wool should be burr picked by all means, as there is present foreign matter which will cause trouble in carding into fine counts, if not removed. The stock is harsh and dry, which shows a lack of oil or emulsion. We would suggest an emulsion composed of 50% oil and 50% water, using 16 qts. per 100 lbs. of stock. Run through the mixing picker three times and sheet up. Do not blow the stock into the bins. See that the Bramwell feed is working properly, the scales dumping in time to allow a compact, even feed. These latter suggestions should aid in overcoming the variations in weight of roving. It seems advisable to suggest making the roving 75 to 78 grains 50 yards on the cards, and condense it harder. This should improve the spinning on the class of stock.

Use of Rayon With Worsted

We have noted numerous reports that have been printed lately to the effect that large numbers of cotton mills are taking up the use of rayon. We presume this is because cotton and rayon combine well in a fabric. We have not heard so much about the use of rayon in fancy worsteds. Can you advise me whether the rayon yarn makes a good combination with worsted yarn? (5417)

Rayon is being used to a considerable extent with worsted yarns, and in the opinion of some people combines better with worsted than with any other textile fibre. One authority who holds this opinion gives his reasons as follows:

1. Worsted is soft to handle and springy in feel. Artificial silk is comparatively hard.

2. Worsted, being a yarn spun from staple, is hairy and, as far as luster is concerned, comparatively dull. Artificial silk, on the contrary, is both free from projecting fibre and is highly lustrous.

3. Worsted will felt and lock together when combined in a woven structure. Artificial silk will not do this, its separate filaments being smooth and continuous in length.

4. Worsted being an animal fibre has affinity for a different range of dyestuffs from artificial silk, the latter being vegetable in origin.

In other words, one fibre supplies just those qualities which the other one lacks, thus making an almost ideal combination for structures which are fancy in character and not too heavy in texture.

In explaining the smaller use of rayon by worsted mills as compared with cotton mills, one authority has pointed out that worsted looms are generally heavier than cotton looms and the preparatory machinery in some worsted mills is unsuitable for dealing with a yarn such as artificial silk. The same authority states that it is in dress goods that one must look for the greatest development of artificial silk in conjunction with worsted.

Cut and Gauge

What gauge is a ten cut latch needle knitting machine? Is it 30 or 36? (5303)

One of the leading manufacturers of knitting machines cuts his cylinders as follows, unless otherwise ordered:

9.5 to 10.5 cut — 24 gauge.
10.6 to 12.2 cut — 30 gauge.
12.3 to 13.6 cut — 36 gauge.

The gauge is usually governed by the weight of goods desired and is determined by the experience of the knitter. If you have a ten cut machine and wish to know the gauge you

can submit a needle or a thin piece of steel which fits one of the slots to any needle manufacturer and he can determine the gauge with micrometers. Spring needle machines have a fixed relation of gauges and cuts, the ratio being as 2 to 3, or 20 needles equal 30 gauge, etc.

Water Requirements for Dyeing and Finishing Knitted Fabrics

We would like to have you give us answers to the following questions:

How many gallons of water per day will be required to dye and finish 1,000 lbs. wool or worsted knitted piece goods per day, such as jersey cloths, astrakans, etc., made from yarn in the oil?

How many gallons of water per day would be required to dye and finish 1,000 lbs. of knitted cotton goods in the string or piece, such as glove linings, etc?

We wish to get the total amount of water necessary to supply the dye and wash house to handle the above production in all the necessary processes, and also allow for cleaning out dye tubs, etc. (5308)

In answering this inquiry we are taking as our basis of computation a 16 string Rodney Hunt washing and dyeing machine. This machine holds approximately 600 gals. of water when loaded, and we have used this figure in reaching our results.

Scouring and dyeing 1,000 lbs. of wool or worsted knitted piece goods means two batches of cloth with 500 lbs. of cloth in each batch. The water requirements per batch are as follows:

1 scouring bath	600 gals.
2 warm water rinses	1200 gals.
1 cold water rinse	600 gals.
1 dye bath	600 gals.
1 warm water rinse	600 gals.
1 cold water rinse	600 gals.
Total per batch	4200 gals.

The total for two batches or 1,000 lbs. of cloth would therefore be 8,400 gals.

Boiling out and dyeing 1,000 lbs. of knitted cotton goods

such as glove linings, etc., in the piece, means processing two batches, each consisting of 500 lbs. of cloth. To boil out and dye each batch will require the following quantities of water:

1 boil-out of cloth	600 gals.
1 warm water rinse	600 gals.
1 cold water rinse	600 gals.
1 dye bath	600 gals.
1 warm water rinse	600 gals.
1 cold water rinse	600 gals.
Total per batch	3600 gals.

The total gallons for two batches of 1,000 lbs. of cloth would therefore be 7,200 gals.

Allowing for two clean-outs of machines per day, with 1,200 gals. to the clean-out, would require 2,400 gals.

The total quantity of water necessary for the production mentioned by the inquirer would therefore be 18,000 gals. The requirements may vary a little due to local mill conditions but the above figures are close enough for you to form an estimate of your water needs.

Two-Sided Dyed Cloth

I am enclosing sample of goods dyed on an ordinary three-bowl padding machine with two immersion rollers. You will notice that the sample marked No. 1 is two-sided; also that it is much deader than sample No. 2. Sample No. 2 represents the shade we are dyeing. The No. 1 sample represents the first 120 yards off each bolt. We cannot understand why this condition should exist, as naturally the goods passed through the same solution, and strange to say the correct shade is obtained after the first cut has been passed through the machine. We can run any number of yards in one bolt without any change after the first cut is through, but immediately we stop the machine and start a fresh bolt the same condition arises and breaks off as before stated at the first cut. It is not only on this class of goods nor on this shade where trouble arises, but we have had it in several instances, and would be pleased if you could give us any information that will assist us in overcoming this difficulty. (5315)

Two-sidedness, such as is shown by the sample of cloth submitted, is less likely to be the result of the padding machine than of the drying, and it is suggested that a careful inspection

of a run of this cloth be made, noting any changes whatever at every stage.

As a precautionary measure, it is further suggested that a small amount of soluble oil be added to the dye bath to aid the dye to penetrate the cloth evenly. It might be mentioned that the dye used on sample No. 1 is not very fast to washing. On testing a clipping, it was noticed that considerable dye came off in the wash water, which reduced the original shade to an appreciable extent. This particular dye might also contribute to the two-sidedness of the cloth. Further, the shade of sample No. 2 is considerably greener and brighter than the good side of No. 1.

It might be possible that the dye used is a mixture of two or more dyes, a portion of which has a greater affinity for the cotton as dyed in the pad than the remaining portion, and hence is taken out of the bath first. This particular point should be taken up with the dye concern from which you obtain your supply. It closely resembles a mixture of the old diamine sky blue and diamine blue 3B.

Cottons Used for Various Yarns

Kindly advise me the grades of cotton used for 2/50s and 2/60s combed peeler yarns; also for 8s to 30s warp and filling. What is the common twist for ring spun yarn? (5323)

Cotton for 2/50s and 2/60s combed peeler.—Most spinners use grade "good" for such work but equally good results can be obtained with grade "strict middling." If a hard western cotton is used a full 1 3/16-inch staple would be sufficient for both the 50s and 60s. If Carolina cottons are used a full 1 3/16 to 1¼-inch would be necessary for the 50s and a full 1¼-inch for the 60s.

Cotton for 8s to 30s warp and filling.—Common upland cotton would be used for 8s to 18s warp and filling, but for 8s to 14s, varying percentages of card strips and soft wastes would be utilized to reduce cost of the mixture. For 14s to 18s straight cotton of this grade and length would be commonly utilized for warps, while for filling about 25% of roving and spinners soft waste, or card strips from longer cottons, or comber waste, might be added to the mixture. For 20s to 30s warp 1 to 1 1/16 inch hard western cotton of strict low middling to middling grade should be used, while

for filling of the same count up to 25% of card strips, soft wastes and comber wastes might be added to the mixture.

Twist of ring spun warp yarn.—Common practice in this country on the character of yarns that you mention is to use a twist for warps equal to the square root of the yarn count multiplied by 4.50 to 4.75, the less amount of twist being used with straight cottons of good grade and staple length, and more twist with poorer cotton and mixtures containing a percentage of waste.

Finishing Terry Towels

Advice as to the methods of handling, dying and finishing terry towels would be appreciated. Please give particulars in detail. (5329)

We have never seen a piece dyed terry toweling, although, of course, the goods could be handled in tints if required. But we fail to see any market requirement for a dyed terry toweling. The usual methods of handling these goods, depending upon the production, is to sew them up on a gray room sewing machine. After sewing up in continuous run, end to end, the goods should be passed through a saturating machine for wetting out. The saturating machine would preferably be a so-called slack washer. From the slack washer, the goods are run into the boiling kier.

As to the chemical formulas, the question of whether the towels have colored borders would determine the exact formula used, and we would refer the inquirer to Perry Bean's "Chemistry and Practice of Finishing" for information on this point.

After boiling in the kier for six to eight hours, the goods should be pulled out from the washing machine, squeezed in a bleach house squeezer and run directly into the bleaching cisterns. These bleaching cisterns consist of a rectanguler shaped cement vat with suitable centrifugal pump and piping, preferably lead lined on the inner surface. The bleaching liquor consists as a rule of either a very weak solution of chloride of lime or liquid chlorine solution fixed with soda ash. The goods should be covered with this bleaching liquor in the bleaching vat for a period of forty minutes to one hour, after which they should be washed down and run through the bleach house washer, or slack washer, and then treated with

antichlor or very weak sulphuric acid. They are then again washed and squeezed, passed into a scutcher for opening them out to full width, and run directly over a 2-roll bluing mangle.

The finishing and drying from this point consists of passing over a festooning or special carrier drying machine designed for handling turkish towels. After the goods come off the dryer they should be ready for putting up. In order to lay out a complete plant, machinery builders would require the number of yards to be run in a nine or ten hour day, the average weight of goods and yards per pound, maximum and minimum widths, and if possible, samples of goods showing colors of borders, etc.

Dressing on Rayon and Worsted Yarn

What are manufacturers apt to use as a dressing for their product? Recently we purchased some fine worsted, twisted with rayon, sample enclosed, on which there was some kind of wax. The writer extracted with carbon tetrachloride some of the yarn, and on evaporating, the solvent forms a pale yellow substance of almost wax-like consistency. It chars very easily, and on one occasion an odor of ammonia seemed to be given off. If it belongs to the wax group, it can be but one, unless the chemical dictionary has omitted to name another wax soluble in carbon tetrachloride. We trust that perhaps you can offer some surmise as to what this wax is, as well as give us an answer to our first question. (5421)

Although a great variety of materials are used as dressings, practically all of these contain varying proportions of softening or lubricating substances and usually consist of oils, soaps and possibly, in certain instances, waxes. The inquirer requests that an opinion be expressed as to the nature of the wax-like substance that was extracted from the yarn with carbon tetrachloride. It is impossible to express an opinion as to what this wax-like substance consisted of. The only way this could be determined is to submit a sufficient amount of the yarn to a competent chemist for analysis.

There are a great many types of oils that are used in softening and lubricating yarns in the spinning, twisting and reeling operations, and these may consist of animal and vegetable as well as mineral oils. Where small amounts are extracted from the yarn with solvents, such oils oftentimes give a residue that has a greasy or waxy appearance and one might

mistake this for a straight wax, whereas it could be oil or a mixture of oils. We would suggest, as stated above, that if the inquirer is sufficiently interested to learn the exact nature of the oil or waxy matter present in this yarn, he submit the same to a chemist for analysis.

Setting Angles of Top Comb and Upper Nipper

Reading Stephen E. Smith's article in your Dec. 13 issue, I note under the heading, "Setting Angles of Top Comb and Upper Nipper," that he says an angle of 34 deg. in the upper nipper is about correct. I would like to ask Mr. Smith what is the correct position for the upper nipper to be in when setting the angle. Should it be at the top, half way down, or in its extreme low or combing position? I think an answer to this question would be instructive to many. (5288)

Mr. Smith replies to this question as follows: The upper nipper should be down in its lowest position when this setting is made.

Shrinking Cotton Goods

I wish to shrink at the mill the enclosed all-cotton fabric. The shrinking should eliminate any further shrinking after cloth is made into garments. Will you kindly advise me the recipe and processes, specifying kind of machines and each step to do this shrinking after cloth leaves the looms. We ordinarily scour in soap and water, and press this cloth. Would you shrink after goods have been wet finished or before? (5301)

These goods are usually subjected to a cold water bath, being thoroughly saturated. The moisture is then squeezed out and the goods are hung up in festoon form to dry. Little or no artificial heat is used, but a good circulation of air is forced through the room. If the goods are to be hung for any considerable length of time in festooning racks, the upper bars of the festooning frame are turned so as to carry the goods along 6 to 10 in. in the festoons, so as to not have too large a body of water on the bottom rack of the festooning. The goods are taken down with as little tension as possible and loosely rolled. They are taken from this rolling and subjected to a light pressing on a laundry machine, running without tension,

and just enough pressing is given to the goods to keep them flat.

These goods are first finished in the regular way, that is, scoured and calendered; the shrinking is the after-process. The festooning frames are usually of local make, though there are two or three concerns who make machines of this character. The saturating tank is constructed on the usual lines. The goods are usually plaited down on a truck, though sometimes they are rolled up on a small rolling attachment.

Rowy Goods

I am submitting you sample reelings of yarn, and also a sample of a fabric with which we have been having a great deal of difficulty, due to rowy or streaked goods in the filling. These rows vary from 1 to 8 or 10 in. in width. The sample reelings are 25 yds. and should weigh 26 grs. There are 44 picks in the filling, the draw being as follows: 1, 2, 3, 4, 5, 6, 7, 8, 6, 5, 4, 3, 2, 1, 8, 7. If you can offer any suggestions which will help us out of this difficulty, I will be very grateful.

(5318)

The reelings of yarn appear to be uniform in size and turns of twist. If you are not already doing so, we advise you to keep the yarn spun from the top and the bottom spools separate and have them woven separately. Also make sure that the let-off and take-up motions of the loom are in satisfactory working condition.

See that the filling yarn is properly steamed before being woven. The steam should be applied at a consistent pressure. Three shuttles, working on the order of a pick from each in turn should be sufficient. In fulling, withdraw the cloth from the fulling mill when the process is about half completed, and re-enter the string from the reverse end. We believe that these suggestions will help the cloth.

Yarns and Constructions for Shirtings

We would appreciate advice regarding ordinary and high grade striped cotton shirting, mercerized in piece. Generally speaking, is the yarn used in such cloth combed or carded? If it is possible, please advise counts of warp and filling yarn used for this purpose. We realize, of course, this mainly depends on the shirting, but what we mean is would good cloth

shirting be made from, say, warp and filling counts varying from 1/16s to 1/60s? Also can you advise as to how cotton weaving mills in America speed up production? (5328)

Piece mercerized cloths of any kind should be made from combed warp and filling, as any inequalities in the yarn will show up very plainly after the cloth is mercerized. The yarns must be free from dirt, slugs, or oil stains. Not all cotton shirting, either with gray or colored stripes and checks, are mercerized. It is usually the all-gray shirting that is mercerized. If the color stripes are to be mercerized the yarn is usually processed before being woven into cloth.

Cheaper grades of shirting cloth are made from carded yarns and the cloth count will vary as follows:

76 x 72—40s warp—35s fill.
68 x 64—30s warp—35s fill.
68 x 56—30s warp—30s fill.

Many of the low count combed yarns shirting cloths are made with the same cloth count as the carded yarn shirtings listed above. Some of the better grades of combed yarn shirtings are constructed as follows (There is a wide variation in the construction of the combed yarn cloths, because the combed yarns used permit of good weaving qualities):

80 x 76—40s warp—35s fill.
80 x 80—40s warp—40s fill.
84 x 80—40s warp—40s fill.
84 x 84—40s warp—40s fill.
92 x 92—50s warp—50s fill.
96 x 92—60s warp—55s fill.

Most of the shirting cloths that are made for piece mercerizing purposes are made on a cotton pongee ground. The cheapest ground on which this cloth is made is as follows:

64 x 72—50s warp—30s fill.

The better grades of cotton pongee are made as follows:

72 x 100—60s warp—45s soft spun fill.
68 x 108—80s warp—45s soft spun fill.

The last is the regular soisette ground. All the cotton pongees are made with a very soft spun filling, the softer the filling the better the luster in the finish. The filling predominates in this type of cloth.

The writer cannot remember any kind of shirtings, other

than work shirts, that are made with the warp yarns of a coarser count than 30s, either carded or combed.

Production is speeded up in American mills by using modern machinery and good yarns, providing sanitary working conditions and paying good wages. The well managed American weaving mills keep abreast of the times. The machinery is kept up-to-date. The warp yarns are of the correct breaking strength. In order to have good weaving conditions, the surroundings of the operatives are kept in a sanitary condition, and the work is well lighted. These are the conditions that make for better production and quality in American weaving mills. Lacking such conditions, no mill can expect either good production or satisfactory quality of product.

Finishing Crepe

Enclosed please find samples of 54 in. wool crepe, unfinished and finished. I would greatly appreciate some information as regards the best way to treat the woven material to get a result like the finished sample. (5307)

We would suggest sewing a set of four or eight pieces together and singeing the face, being careful not to over-singe, which would cause the goods to burn or become too brittle. Then take them to the scouring machine, having two pieces in one string; that is, if an eight piece set, have four 2-piece strings or drafts. Then proceed with scouring in soap for a period of about 20 to 25 minutes, having sufficient liquor in the washer to keep the goods floating around to change their position while running. Note that a full bath of water while washing off is necessary, keeping the temperature of water at about hand heat. The time of rinsing is about 45 minutes. Cool off 10 minutes, fold goods over, and straighten them out before sending to the dyehouse, giving the goods an opportunity to change their folds in runnnig while in the rope form.

After dyeing, extract, dry and examine for shade. If satisfactory, have the goods singed once more, cleaning the face and getting that clean, crisp handle so characteristic of crepes. Wash off in a kettle, adding one quart of acetic acid to the bath. The acid brightens the color after singeing, which has a tendency to change the shade. Thirty minutes should prove sufficient time for the process. Extract and dry wide enough to allow for further finishing. Burl and shear, run over a

steam brush, steaming well and getting all possible crepe to show, then tenter to width.

The following directions should be particularly noted: Use a sewing machine for seams, taking the greatest care to have small neat sewings. Use pot eyes or sticks to keep goods compact, making a good cushion under the roll. Have as little weight on the fabric as possible while scouring. Keep temperature of water only hand warm while scouring, and have plenty of water in the bath. This is very important. If the above directions are followed, there should be no difficulty in finishing this fabric.

Emulsion for Worsted Drawing

Will you please give me directions for a good emulsion to be used in worsted drawing. (5325)

A worsted mill man replies as follows: Use 9 gals. of olive oil to 41 gals. of water made up in a 50 gal. tank or barrel. Put the oil in and fill the tank about half full, adding about a pint of ammonia. Boil until the mixture is thoroughly emulsified and then fill the tank up full with cold water. Stir well and the emulsion is ready to use. Ammonia is best for cutting the oil as the emulsion doesn't get thick, as is the case when borax is used. Where the emulsion is required to be lighter or heavier, use more or less oil, to suit the conditions. In cases where the wool is sticky a little kerosene oil is very helpful.

Spots on Dyed Hosiery

Enclosed find a pair of half-hose upon which are spots of a brown nature. The hose are knitted with mercerized yarn and artificial silk. Will you let us know what these spots are and what causes them to appear on this particular color? (5314)

Owing to the very uneven distribution of these spots on the hose, and also the distinctly irregular outline of each, we are inclined to regard them as having been caused by some solution that has been splashed upon the goods during their handling or manipulation in the dyehouse. One thing is certain; the spots were made after the hose had been knitted. It is within the bounds of possibility that something had been splashed on

the hose before they were sent into the dyehouse. Under such conditions, the substance so splashed acted as a resist for the dye. A test applied to the hose with a view to ascertaining the cause of the spots failed to indicate that the trouble was due to either an acid or alkaline substance, since neither sulphuric acid nor ammonia caused the slightest show of spotting. It might be possible that mildew is responsible for the trouble, but there is no way of ascertaining this without a microscopical examination.

Softener for Cotton Yarns Dyed with Sulphur Colors

Kindly let me have a good inexpensive recipe for making a softener for cotton yarns that are dyed with sulphur colors. Please give method of using. Also kindly let me know if tri-sulphonated cocoanut oil is good for this work. (5312)

A softener used with good results is made up with 250 lbs. of good seconds castor oil mixed with 30 gals. of water, in which has been dissolved 40 lbs. of 98% caustic soda. This is boiled until the oil is completely saponified, and a clear transparent liquid is obtained. This is now mixed with cold water until the mass measures 100 gals., when the preparation will be finished and ready for use. The total cost, including oil, chemical, labor and overhead, should not be over 5 cents per lb.

This softener imparts a full, firm and yet pliable or soft feel to the yarn. It also tends for better leveling of the dyestuffs, which results in a more even dyeing. One per cent. of this softener on the weight of the goods is used, and is put into the dye bath at the start of the dyeing process.

Tri-sulphonated cocoanut oil may be used for this work, but the writer is satisfied with the castor oil softener, which is easier to make and gives good results.

Resist Stains on Broadcloth

I am enclosing a few samples to illustrate the nature of some trouble that we just ran into on one lot of broadcloth. It seems to be entirely different from any type of resist that I have ever seen before. We have tried to dye it with several types of colors and they all show the same type of spots. I am enclosing

two of these; sample No. 1 being a diazotized and developed color, and sample No. 2 a vat color. It will be noted that wherever these resist spots appear on sample No. 1, there is likewise a soft or tender condition, but this does not appear so evident on the other sample.

I have tested the goods for oxycellulose and have found that this is not present as there was no copper oxide formation when the goods were boiled in Fehling's solution, and sample No. 4 shows that there is no red coloration around the tender spots. The goods were then tested for hydrocellulose by dying some of the damaged pieces in both a Direct Sky Blue and Methylene Blue bath, and it was found that wherever the bad spots were there was a poor affinity for direct color but a marked affinity for basic colors, and this would seem to indicate hydrocellulose as the cause of the trouble. The sample No. 5 shows the poor absorption of the direct colors, while sample No. 6 shows the way the basic color was taken up. In regard to the latter dyeing, I tried to strip all of the color off the piece before dyeing with basic colors, but this was found to be impossible as there had been some Chloramine Yellow used along with the diazotized and developed orange, and there was a yellow bottom of direct yellow on the sample before dipping in the blue, as shown by sample No. 3. Kindly let me have your earliest opinion on the cause of this trouble and also please advise if there is any way in which these goods can be reprocessed to remove the resist and allow redyeing successfully. (5322)

An examination of the swatches showing resist stains discloses a marked disintegration of the cellulose. There is no standard method of determining whether resist is caused by oxycellulose or by hydrocellulose. These two products as a rule are formed simultaneously in varying proportions; if oxycellulose is produced at the beginning of the bleaching process, subsequent treatments may eliminate the oxygen, leaving other decomposition products of cellulose.

Resist stains of the general type exhibited by the sample submitted may be formed in several ways. The chief causes are as follows:

(1) In singeing, the presence of calcium, zinc, or magnesium chlorides in the sizing gives rise to tendering and resists due to the formation of mineral acid on the fabric by the heat.

(2) In kier boiling, exposure of the cloth above the surface of the liquor, whereby the goods are subjected to both the action of concentrated hot alkali and also to the oxidizing action of the air contained in the steam. In the case of the lime boil,

local drying results in the formation of calcium carbonate which may cause resist and tendering.

(3) In mercerizing, air drying of the cloth before the caustic has been thoroughly removed often results in resists of the type under consideration.

(4) In chemicking, the use of concentrated or over-active bleaching liquors or local drying of goods saturated with chemic of normal strength will form oxycellulose. The presence of metallic salts in the bleaching solution or in the goods acts as catalyzing agents, promoting over-oxidation. Nitrates, chlorides, and sulphates of copper, cobalt, manganese, nickel, and iron are most active.

(5) In souring, local drying of cloth which has been treated with dilute mineral acids tends to form hydrocellulose.

The successful treatment of cloth containing resists of this sort, in order that the goods may be redyed, depends largely upon how far the disintegration of the cellulose has progressed. The following method has been found to produce the best results:

Piece goods are run six ends on the jig in a solution containing one gallon of titanous chloride (this agent is used extensively for stripping certain classes of dyestuffs) and two quarts of muriatic acid to fifty gallons of water, at a temperature of 160 deg. F. The goods should then be thoroughly washed and soaped. This treatment will often reduce or eliminate the resist, and it is asserted that in some cases tender places in the cloth are somewhat strengthened. Two of the swatches submitted, treated in the laboratory by this method, upon redyeing, showed marked improvement. It is, therefore, recommended that it be tried on the practical scale by the inquirer.

Dyeing Knit Tubing in Kier

We are large manufacturers of knit tubing as per enclosed sample. We have been dyeing this for years in an open tub, but we can see where there would be great economy if we could dye this in a kier in continuous lengths. Greater economy can be effected by our not having to cut the material. We have installed a kier and have been experimenting with this tubing. The enclosed sample is dyed in the kier, but the difficulty is that we find that the liquor does not circulate evenly through the material. On the top it seems to be dyed perfectly, but

when we get to the center of it, there seem to be a lot of white spots. Or in other words, something keeps the circulation from working through the material evenly. Will you please write us on this? We would like to have full details of any information which you can give us that will enable us to make a complete circulation of the liquor and get a tubing like the enclosed sample. (5321)

Some mills have attempted to dye cotton goods in the kier, but they have always run up against the same trouble that you are experiencing. A few hints may help you with your experimenting. For dyeing in the kier the loading of the cloth is of first importance, as no pockets should be formed; the goods should be packed evenly throughout. The goods should have a good boil-out, using the ordinary detergents plus a sulphonated oil. In the process of actually dyeing, the kier should be so constructed that the dye liquor circulates freely at all times; also so that the liquor can be brought slowly to the boil, thus preventing any unevenness from a too rapid rise in temperature. The addition of salt should be made after the goods have come to the boil as another preventative of unevenness.

Quick Test for Dyes

We are interested in a simple laboratory experiment that will enable us quickly to determine from a small piece of fabric or wool whether same has been dyed with chrome or acid color. We would be very grateful if you would give us such a formula. This is something that should be performed in a minute or two, if the process is to be useful to us. (5330)

There is really no simple laboratory test that can be made in a minute or two that will give any reliable information in determining whether a piece of woolen fabric has been dyed with acid or chrome colors. However, one familiar with testing textiles can make the following test quite rapidly and it is accurate:

Take a sample of the goods and ignite it in a porcelain dish until all organic matter has been burned off; then add a pinch or two of potassium chlorate and fuse the ash. Dissolve ash in water, filter, make acid with acetic acid, and add a few drops of lead acetate. If chrome dyes were used, you will get a yellow precipitate of lead chromate.

Lubricating Knitting Machines to Prevent Spots

We are manufacturers of 220 needle half hose and have heretofore knit all of our goods in the gray, but we are beginning the manufacture of ingrain goods, and we would like to have the benefit of your advice as to the best method of lubricating the cylinders and needles of the knitting machines so as to avoid oil spots on the goods. We wish especially to avoid that streak across the heel which is caused when the long butt needles are raised and any dirt on the needles is wiped off on the yarn. (5334)

If your cylinders are thoroughly cleaned, wiped dry, and oiled well with a small amount of stainless oil, we do not think you will have any trouble from needle marks. Some mills make a practice of cleaning bright machine parts with hot caustic soda, following the soda bath with very hot water or steam, and being careful to rinse all of the sediment and dirt out of the slots. You will find it advisable to oil as soon as the parts are dry to prevent corrosion from contact with the operatives' hands. Since it takes approximately 400 deg. F. to start the temper of steel, you will readily see that you cannot soften needles or sinkers with boiling water.

A mill superintendent to whom this inquiry was sent replies as follows: Use a so-called soluble grease and apply it at butts of needles. I recommend Borne-Scrymser Company's AX 8; also AX 4 oils for this purpose.

Another mill man offers the following in reply to this question: It has been my experience that oil spots and streaks cannot be entirely eliminated. But they can be reduced to a minimum by using extreme care in the method of lubricating the machines. The method I have always employed in knitting delicate colors is first to strip the machines to be used of needles and sinkers and wash well with gasoline or Oakite to remove all traces of old oil and carbon. Immerse the cylinder and sinker ring, needles and sinkers; also jacks if they are being used. When dry reassemble the parts and oil very sparingly with a good grade of stainless oil, being very careful to oil sufficiently to lubricate and yet not leave any suggestion of an excess of oil on any part of the machine. This should be attended to by the fixer or someone whose judgment can be absolutely relied on, because of the unusual expense caused by damaging ingrain goods.

If these methods are followed the goods damaged by oily

conditions will be reduced to a very small percentage. The few goods that may be oil-stained accidentally can be cleaned by first applying a little cocoanut oil to the spots to soften the lubricating oil, then removing the spot or stain by a light application of benzine or ether on a piece of clean waste. This should leave the goods in salable condition.

Spots on Shade Cloth

I enclose herewith samples of shade cloth which you will note show spots, which the manufacturer of shade cloth says are due to the unsaponifiable material contained in the size. Our opinion is that these spots are caused by lime soaps depositing on the cloth in the process of boiling-out. We are not certain whether this is done in closed kiers but are rather of the opinion that the boiling-out is done in the rope in open kettles. You will note that these spots are particularly visible in the shade cloth after it has received its coat of green pigment. Your advice on this matter will be very much appreciated.
(5339)

We cannot agree with the inquirer that the cause of the faults on the finished shade cloth is the depositing of lime soaps in the boiling-out process. Lime soaps depositing on the scoured goods would give a shaded and semi-opaque appearance to the fabric upon being held between the vision of the inspector and the light. The sample of scoured fabric is entirely clean. It represents a well-scoured piece of goods which would be practically a perfect white if treated with chloride of lime to bleach. The slightly yellow stain shown in the scoured sample, in the writer's estimation, would be removed if the goods were full bleached, and is more or less the result of air stains due to over-exposure to atmospheric conditions while in a slightly damp condition.

Unquestionably the lumps or spots in the filled goods result from the doctor blade or blades on the opaque finishing machine not functioning properly. There is a wide difference of opinion as to how many doctors should be used on this class of work. The writer has had considerable experience in dealing with shade cloth manufacturers and finishers and knows that some concerns use only one doctor blade on the goods, while others use two and three. We know that one of the best concerns in the United States on this class of work uses

two doctors on the machine and we understand that they never have trouble of the kind shown by sample.

If the doctors had been functioning properly, they would have smoothed down the lumps which are on the filled side of the goods. By the simple procedure of passing a round metal surface over these goods in their present dry condition the lumps are considerably smoothed out, and partly broken up, and they become very shiny. It is, therefore, evident that in the wet starched condition these lumps could be entirely eliminated if the doctor blades were made to work correctly.

Difficulty in Wool Carding

I am enclosing a sample of stock which I have been asked to run on the cards at 190 grains for 50 yards for 1⅝ run. The silk does not seem to card out. I have garnett breasts on the cards and they are in good condition. I also have a lot of trouble in keeping my first breaker fancy clear. It is a 10 in. fancy and is clothed with 26/30 straight tooth open set. They are all ground up smooth with no hooks on the points. My cylinders are turning at 65 turns a minute, and the fancy at 400 turns per minute. Could you suggest some way to run this stock and have the first breaker fancy clear itself? The other fancies clear all right. My first breaker is set free to a 26 gauge for workers and strippers, and 28 gauge for fancy. (5333)

The main trouble seems to be in the weight of the roping; 190 grain on the card will allow 85% delivery or roping on the mule for 1⅝ run yarn. This is not a suitable draft on the class of stock in question. It seems advisable to speed up the first breaker fancy, also to set it on harder, so that it will clear the cylinder properly. Also set the card to a 28 gauge, and run the doffer faster, which will clear the stock from the main cylinder more satisfactorily.

Hosiery Heels Do Not Take Dye

Enclosed find a pair of worsted hose. We would draw your attention to the heels. These hose have been dyed in a paddle wheel dyeing machine, and have been stripped and re-boiled three times. We are having a lot of trouble in this direction, in that the points of the heels are not taking the dye. Would esteem it a favor if you could advise us what we could do to obviate this trouble. (5343)

Your trouble is a very common one among hoisery mills. If you are not scouring your goods before dyeing, you should certainly adopt the practice. If you are scouring, your process is not thorough enough. Perhaps you need to increase the quantity or strength of your soap, or lengthen the time of treatment. A higher temperature would be effective, if you could raise it with safety. Suppose, for example, you are scouring at 110 deg. Raise this to, say, 120 deg. (On no account exceed a temperature of 130 deg.) The point of the heel, where your trouble lies, is necessarily more tightly knitted than any other part of the stocking, and penetration of the liquor at this point is naturally more difficult. Unless the oil is removed by the scouring liquor, the dye will not be absorbed at this point.

Shadiness in Bleached Blankets

We would like you to help us out on a matter, if possible. We find that after our blankets are bleached circles appear. When the blankets are not bleached these circles are at least not apparent. We think that the blankets are perfectly clean when they enter the bleach house. We also believe our bleach house is air tight, and our blankets are getting an efficient bleach. After the blankets are scoured, they are extracted and hung in the bleach house from three to five hours, and then are pulled down, dried and are ready for the napper. We do not find any odor in the blankets, but only the circles as mentioned above. (5284)

With the limited information this inquiry gives, and no sample to examine, it will be rather difficult to give the aid desired. However, some of the troubles usually encountered in sulphur bleaching will be enumerated. First, it is called to your attention that there are many defects brought out by bleaching that are not noticeable before bleaching. Make certain that there is no source of oil stains, especially on your looms. Another cause of shadiness is uneven threads or uneven tension on the threads during the manufacturing of the blankets. So much for the mechanical end.

In scouring make certain that there is enough circulation in the machine to give a uniform cleansing. Also rinse thoroughly with at least three warm fresh waters. The fabric should be free of oil and soap. It also is very important that the goods be uniformly extracted, and that they are not placed

in the sulphur house so wet that dripping will occur; nor of course should they be placed therein too dry. The sulphur fumes in the smoke house should be circulated about by means of a fan.

Weights on Wool Card

Can you give us some kind of an idea as to how many spools having a 10 in. diameter head it will be necessary to fill with roping before a card set for say about 2½ run will weigh up. We seem to have considerable difficulty in being able to get our weights, which of course is giving us a lot of waste. There are times when we start through a twenty-five pound sample and we get from six to ten pounds of yarn, which is certainly out of the question. (5324)

As a rule, one pair of full spools is all that is necessary to get the proper weight on the card, otherwise the weighing mechanism on the Bramwell feed must be at fault. It may be necessary to speed up the spike apron so that the scale will get its weight quicker. The compensator in the hopper may not hold the stock up to the spike apron properly. Also the clutch mechanism may be at fault. A careful inspection of the Bramwell feeder will, no doubt, reveal the fault of unevenness in the weight of the roving.

Wool Sorting and Wool Grades

As our washing, scouring and drying department overbalances other departments, we intend to keep it going by sorting, scouring and drying and baling raw western wool for distribution to other factories. Please answer the following questions: (1) How much wool can a sorter handle in a day? (2) Would the scoured and baled wool sell to the mills, unsorted? (3) Itemize the fewest possible sortings for this trade. (5341)

The inquirer does not state whether the wool has been graded or not. We are assuming that it has been graded. A wool sorter can sort from 650 to 900 lbs. of wool per day and in some cases 1,000 lbs. per day, depending upon the quality and condition of the wool. Of ¼ blood, a sorter can sort 750 to 900 lbs. per day; ⅜ blood, 750 to 850 lbs.; ½ blood, 700 to 800 lbs.; XX, 650 to 750 lbs. The amount of wool sorted in a day may be less than the above figures and sometimes may exceed them; it depends how particular the mill is with its

sorts, also on the amount of paint, stains, black, burry, tags, britch and fribs there are in the wool. For example, the more paint on wool, the more clipping there is to do, with less production. If little or no paint is present it will aid in securing maximum production.

Scoured and baled wool unsorted will not sell to the mills, as wool is usually spun to the limit, or nearly so, both in worsted and woolen yarn manufacture. In order to spin to the limit it is necessary to sort the wool, and the time for doing this is in the grease or fleece, where length and diameter of fibre can be readily detected.

The fewest possible sortings for the trade are as follows: One-quarter blood fleece—Low ¼ blood staple or britch, ¼ blood staple, ⅜ blood staple.

Three-eighths blood fleece—¼ blood staple, ⅜ blood staple, ½ blood staple.

One-half blood fleece—⅜ blood staple, ½ blood staple, XX staple.

XX fleece—½ blood staple, XX staple.

Any wool sold to the trade should be sorted and scoured, so if one mill is using ½ blood staple its needs can be supplied; if another mill is using ¼ blood staple, it does not want XX or ½ blood. So in any case, sorting is essential as well as scouring, whether it is being done for your own mill or for the trade.

Bleaching Slubbing

Is there any simple way in which carded wool slubbing can be bleached besides by the sulphur burning process? Can it be done in a backwasher? If not what special equipment is necessary? Our yarn is stained and we are now thinking of bleaching in a better way, which will entail less handling of the stock. (5344)

You will find it more advantageous to bleach your material after it has been spun into yarn or woven into cloth. There is very little bleaching of slubbing being done in this country. Outside of the sulphur bleach there is the so-called peroxide method of bleaching, which eliminates stains and gives a permanent white which the sulphur process does not give. However, this process entails a higher chemical cost and unless

you have special equipment will also entail more handling of the stock.

For bleaching slubbing by the peroxide process a vat equipped with a special rack is necessary. The vat must also be equipped with a pump for circulating the liquor. The importance of a pump will readily be seen when you consider that this class of material cannot be handled, especially when wet, without causing unnecessary waste and damage. By means of a pump for circulating, the goods are not handled until finished. The scouring, bleaching, soaping and rinsing are all done in the one vat.

Many people bleach wool in the raw state before carding, but if your slubbing goes into yarn this would be the best time for bleaching.

Fulling Heavy All-Wool Felt with Sulphuric Acid

We are manufacturers of heavy all-wool felts, some as thick as 6 in. We full in sulphuric acid. Would you please tell us the proper degree of density of acid, by hydrometer tests, which should be used in this work, subject, of course, to some variation in accordance with thickness of material. (5285)

If I had to make or rather to finish a 6 in. all-wool felt, I would first put it in the mill with an ordinary solution of soap and alkali, leaving the felt in a slightly under-moist condition at first, and after running a while and heating up would add more of the fulling solution until it began to show a trifle soapy. I would run it for as long a time as I felt fulling was being done. I would then take out, thoroughly scour and if the piece were not too big or bulky, extract same. If the piece were large and bulky, would drain on tables over night.

When the felt had been reduced to a damp state, I would wet out with the sulphuric acid solution on the floor by a sprinkling can, or other means, and not in the fulling mill. I would use about a 5 deg. Be. strength of acid, which would be less than this of course on the felt, the latter being already somewhat moist. Would run it slowly in the pusher mill or a falling stock, for half an hour or so, and if it got to about blood heat, I would not put any more acid in whatsoever, but continue fulling until the proper size density or thickness, etc., was obtained. If it did not heat up properly within a half hour, it would show me that either I had not got enough goods

in the mill or that the acid must be increased in degree. If enough felting had not been obtained I would add some more of the same degree acid and run to ascertain if the action were right.

If I could not get what I wanted after a reasonable time with this procedure, I would take out this particular piece, scour it, extract or drain as heretofore mentioned, and again put in the fulling mill; this time using about 7 or 8 deg. acid. If I did not get results would repeat as before with about 10 deg. acid. After the first piece or two one could easily tell how much strength of acid it was necessary to use. I would not advise using over 10 deg. Be. on any felt at any time as the fabric is liable to be injured and not felted.

You will note in the above that even though I might use acid treatment at the end, I would still use soap and alkali at the beginning. This is because I feel that soap and alkali really give the best and firmest felt, and that fulling with acid alone is more of a physical contraction than pure felting.

I regret that it is impossible to make any definite statements on the order that a 5 deg. solution should be used on a 4 in. felt, a 7 deg. solution on a 5 in. felt, etc., because of the fact that so much depends upon the stock used, how clean the stock is, the carding, methods of laying up the batt, hardening, etc. Each case must be judged on its own merits and if the correct result is not struck the first time, experiment with one piece before going ahead with the rest of the lot.

JAMES W. COX, JR.

Softening Threads for Garnetting

We are at present garnetting soft twist, medium twist, hard twist and worsted threads on a 2 cylinder garnett. The garnetted product has small threads in it which seem to be the hard twist and the worsted threads. We experimented by soaking a sample of the hard twisted threads in plain hot water and wringing them by hand. We then put them in the garnett machine without their being picked and the product was good. There were no signs of threads at all. Of course we could not do the same on large quantities. We wish to inquire which is the best way to emulsify these threads. Is a wool oil used? If so, in what proportionate quantities to every 100 lbs. of thread. We trust that you will be able to help us soften these threads so they will garnett good. (5356)

It is not the usual practice to pick and garnett worsted threads without first treating them with an oil emulsion. These materials should first be picked, before being garnetted. The best method is to spread the threads on the floor and deg them with an oil emulsion, say 3 qts. of oil and 1½ gals. of hot water, with sufficient borax (possibly 2 or 3 ozs.) to bring about the emulsion. If the threads are very hard twisted, it might be a good thing to cover them up over night so as to allow the emulsion to penetrate the material thoroughly. Any of the usual wool oils on the market will do for your purpose. The sellers would give you instructions as to the making of the emulsion and whether ammonia or borax, or some other alkali, should be used. You might find that one gallon of oil and two gallons of water would give you even better results; but this can only be ascertained by your own experimenting.

Combing Dyed Tops for Heather Mixtures

Will you kindly give us information regarding "jig combing" as applied to heather mixed yarn. Is it cheaper than recombing? Is it necessary to recomb all heather mixes? Will you kindly give a representative cost per pound of frame spinning and mule spinning? (5345)

When wools are recombed the first combing is generally known as "jig combing." A blend (mixture) of colored tops may be made from tops dyed and not recombed, or from tops dyed and recombed. The blend may be made before recombing or after recombing. The yarn produced from blends recombed will be superior to yarns produced from (1) blends made from dyed top, not recombed; (2) blends made after recombing the dyed top. This applies to both the French and Bradford systems.

The representative cost per lb. of spinning on frame and on mule cannot be given because spindle speeds, turns per inch and efficiencies vary. Mule yarns cost more than ring spun yarns and cap spun yarns cost less than ring spun yarns. The market quotations reflect this.

After the above question and answer had been printed, the following comment was received from a reader: Perhaps I may be able to offer a few suggestions to your inquirer No. 5345, whose question with reference to dyed tops was published in your issue of March 14. If the correspondent is using wools

of ⅜ blood or lower there is no necessity of recombing to get both a good result and an even blend. I would suggest recombing in all cases of higher quality tops. The following is my method of dealing with all kinds of blends for coating, hosiery and hand-knitting yarns:

The tops are dyed in the first instance by the Franklin top dyeing machine, which I have found to be very successful. After dyeing, I use no method of blending but take the tops direct to the first can gill box of the drawing. For example, take a heather mixture of the following proportion: 80% black, 10% cardinal, 10% gold. First weigh out the blend in 100 lb. lots as follows: 80 lb. black, 10 lb. cardinal, 10 lb. gold, and run through gill box in separate 100 lb. lots up to the draw box. The various lots can then be put together without any fear of the ultimate shade.

If this method is carefully carried out it cuts down the cost of a heather mixture to within 5c. of a yarn dyed solid shade. I have used this method for about 15 years and have had no trouble. The doublings in the drawing are also an important factor. I will outline the ones I use, which are giving good satisfaction.

1—can gill box	6 ends
2—2 spindle gill	6 ends
3—4 spindle draw	4 ends
4—6 spindle weigh	4 ends
5—8 spindle finisher	4 ends
6—8 spindle second finisher	3 ends
7—reducer	2 ends
8—rover	2 ends

If the counts are below 20s, I eliminate the first finisher, and the rover.

Yours very truly,

R. M.

Cost of Tricot Fabric

I would like to know the cost and selling prices on tricot jersey cloth. The grades of cloth I intend to make are two warps of hard silk 20/22, and another of two warps of soft silk, 2 thread. What price can I get for this class of goods dyed, as I have two firms that want to buy my goods when I start? (5348)

Using 20/22 silk on both beams will produce a tricot cloth selling around $1.50 per sq. yd. With silk in the neighborhood of $6.50 per lb. that would be a good price, assuming that the cloth is knitted of sufficient density or stiffness to allow the fabric to be good enough when all the gum is extracted, which of course takes place after the piece of cloth is made. The required density may be attained by running off the bottom beam 12 in. to 164 courses; the top beam to run off at the same time 18 in. to the same number of courses. The warps are made 100 yds. bottom beam to 150 yds. top beam. By running the beams in 156 courses to 12 in. bottom, and 156 to 18 in. top, a slacker quality will be produced, which could be sold around $1.40 or $1.45.

It is not a good plan to put any large amount of weight on the cloth roller in order to pull down the slacker qualities, as such a method puts an extra strain on the needles, thereby tending to their disarrangement. It will also increase the liability to stop marks or shades across the piece each time the machine is stopped to put in a broken thread, or for other reasons. Rather it is better to decrease the amount of tension on the beam cords and slightly elevate the needle bar, for which there are gauge screws provided on its lower side.

For the stiffer (tighter) qualities, depress the needle bar slightly. By this method it will not be necessary to alter but slightly the tension on the beam cords, as too small an amount of tension on the beams will induce a snarling of the silk as it is entering the guides. The latter of course means more damages in the piece of cloth.

In the case of two-thread boiled-off silk, we presume it is intended to use 13/15 two-thread. This cloth knitted 166 courses to 12 in. bottom beam, and 18 in. top beam, will produce a cloth selling for $1.70 to $1.75 per sq. yd. Knitting slacker, say about 158 courses to 12 in. bottom beam, will produce a cloth of less density, selling at the present time around $1.65 per sq. yd. It is possible to knit as tight as 172 courses to 12 in., which should bring $1.80 per sq. yd.

The market price of silk is always a great factor in the cost and selling price of the finished goods. The buyers of the goods sometimes furnish the raw material.

Yarn for Plating

What numbers of mercerized and cotton yarns are best suited for plating on a Scott & Williams machine, 220 needle, 3½ in. cylinder? (5350)

Scott & Williams, Inc., reply to this inquiry as follows: With regard to yarns best suited for plating on 220 needle, 3½ in. machines, would state that 150 denier rayon over 60/1 gassed mercerized, or 4 thread silk over 60/2 gassed mercerized, make a good plated stocking.

Sewing Thread Loses Strength in Bleaching and Dyeing

We are putting up a line of six-cord sewing thread in four sizes and two colors and we have had some difficulty with this thread yarn after it is bleached and dyed in that it does not seem to be as strong as it should be. We buy this material in the natural and bleach and dye it in our own plant, using a chlorine solution for the bleaching; dyeing with a black sulphur dye. The breaking tests on the natural yarn show up favorably, but very poorly on the black when it is ready for shipment. Our bleaching process is as follows:

We first boil off the yarn in a caustic solution and soap to remove the oil and wax and then give the yarn two soap treatments of a chlorine solution. After these two chlorine treatments, we give the yarn a hydrochloric acid bath and then a soap bath made with 15 lbs. of monopole oil and 12,961 lbs. of water. In this bath, we put a small amount of ultramarine blue to give the yarn a slightly bluish tinge. The dyeing process is a regular sulphur dye and the formula is furnished us by the manufacturer. We would like to ask if you have any suggestions as to the preserving of the strength of this yarn after it has passed through these operations. Is there any treatment it could be given to restore its tensile strength? (5358)

There are, of course, several places in the processing of this yarn that could be responsible for the deterioration in strength complained of. There is nothing that can be done to tender finished yarn that will restore its strength. The most logical thing for the inquirer to do is to carefully check up the various steps in the processes of boiling-out, bleaching and dyeing.

We would suggest that the inquirer first take samples of yarn of the same size and quality and test them for tensile

strength in the gray. Then take out a skein, dry, bring to the same moisture condition, and test after boiling-out and first washing. Take a similar skein and test after the bleaching and washing; another skein after the acid and washing treatment. (Also test this skein after the acid and washing treatment for traces of acid. This can be done by the use of sensitive blue litmus paper, which will turn red if there are minute traces of acid present in the yarn. The yarn should of course be wet when this test is made.)

We note that the thread is being put out in two colors, while the inquirer only mentions that they have trouble with the black, which is dyed with a sulphur black. It is a very common occurrence for cotton goods dyed with sulphur black to become tendered. This is something that practically every mill dyeing sulphur blacks has experienced, for there is always danger of tendering when dyeing sulphur colors, especially blacks.

This tendering of cotton dyed with sulphur blacks is attributed to the slow oxidation of the chemically active sulphur present in the dyestuff, which becomes gradually oxidized to sulphuric acid, which, in turn, seriously corrodes or weakens the cotton. The oxidation of the active sulphur usually begins as soon as the dyed fibre is rinsed after dyeing and does not stop until it is finally oxidized to sulphuric acid. The process of oxidation under normal conditions is slow and may cover a period of months and years, and in some cases the goods may be used and worn out without tendering being detected. However, under certain favorable conditions, this tendering develops very rapidly.

There are certain after-treatments that are sometimes employed when dyeing sulphur blacks on cotton for retarding or overcoming this subsequent tendering. Such methods are used as after-treatment of the dyed cotton with one and one-half to two per cent of sodium bichromate applied in a fresh bath after the final wash from the dye bath. This after-treatment is carried out usually at 180 deg. F. for 20 to 30 minutes. Then the cotton is given a thorough wash. By this treatment the active sulphur is considered to be immediately oxidized and subsequently removed by a thorough wash, along with any excess of chrome salt used in the after-treatment.

Another treatment is to give the cotton, following its final wash after dyeing, an additional treatment in a fresh bath

employing sodium acetate. The object of this treatment is to neutralize any free sulphuric acid that might develop, the reaction being that sodium sulphate is formed along with free acetic acid. The free acetic acid, being an organic acid, has no corrosive or tendering effect on the cotton. If this trouble is a very serious problem we would suggest that the inquirer employ a reputable chemist to make a complete investigation of the processes and definitely locate the cause of the tendering.

Mold for Leading Needles

When changing from an 18 in. cylinder to a 12 in. cylinder on a Tompkins spring needle machine, is it absolutely necessary to use a different mold for leading the needles? Our needles run three to the lead. (5362)

Tompkins Bros. Co. reply to this inquiry as follows: It is not practical to run needles which are made for an 18 in. cylinder on a 12 in. cylinder, as the angle or level on the sides of the lead does not conform near enough to the shape of the cylinder. On sizes ranging from 14 in. to 20 in., we usually make a mold to a 16 in. cylinder. This enables us to go down to a 14 in. and up to a 20 in. On sizes smaller than 14 in. it is not practical to go down more than one size and up about two sizes.

Finishing Crash

I am enclosing herewith small sample of 40 in. crash and would like to have a formula to produce the same results in finishing as shown by the sample; also the best way to proceed to match the finish and the machinery required to handle this class of work successfully. (5326)

After bleaching in the regular manner, mangling and drying, these crash goods are evidently dyed on a 2-roll padder, dried up over a cylinder drying machine, and then starched on a 2-roll mangle with a mixture containing 75 lbs of white corn dextrine and 10 lbs of some good grade of tallow softener. Then they are again dried over a cylinder drying machine. Following this the goods are taken to a 40 ft. tenter, with steam box at entering end, to even up the width and bring it somewhere near the required finished width.

From the tenter they should be taken to a 5-roll calender with three metal rolls and two cotton or combination rolls, run cold and with very light pressure. This finish is a very good imitation of a linen crash. The calender should not carry too much pressure nor any heat, otherwise the threads will be flattened and made too shiny or "flazy" looking.

As a rule, it is customary to finish these goods woven 37½ in. to 36 in. width, on a 40 ft. tenter, and this should give the required width. However, if the goods are required finished within ½ in. of gray width, it would be policy to tenter them, using a starch mangle as mentioned, six cams, and a 90 ft. tenter with automatic winder, tenter housing and hot air heating system to keep them out to width. The sample, however, has been finished over a short tenter as the filling threads do not show the effect of any effort being made to bring them out to woven width.

Width of Laundry Bags

Can you find out for me what width nets are most generally used in laundry bags and give me the width of looms most commonly used? (5360)

Most of the mills weaving laundry nets and mesh bags for dyeing, degumming, etc., use a 1 x 1 box loom, 44½ in. between swords, having a 16-harness heavy gauge dobby with which a leno motion is used. The bags are woven in widths of 18, 24, 32 and 36 inches on this loom.

Tender Filling in Striped Toweling

We enclose a cutting of cloth which you will note is apparently tender where the filling is covered by the blue stripe. In the body of the cloth the filling yarn is all right. The blue yarn also is not affected. What would, in your opinion cause the deterioration of the filling beneath the blue yarn while the same yarn in the body of the cloth retains its ordinary strength. We enclose a cutting in the gray (unbleached) which shows no evidence of weakness. This cloth, after bleaching, is finished in a mangle and considerable pressure is exerted on the cloth. (5351)

Upon thorough examination and dissection of the warp and filling in both bleached and gray fabrics, it is very evident that the filling yarn is distinctly low grade and without sufficient

twist, and that even in the gray it has no real strength. The weave in the gray or white portion of the fabric is of such design that it naturally strengthens the fabric by binding in the filling. Under the blue stripe the filling is exposed on the back and the mangling with considerable pressure has not helped matters any, as the filling at this particular point has taken practically all the strain. The filling yarn is practically as strong in the bleached condition as it is in the gray, and the bleacher cannot be held responsible for this fault.

It appears to the writer as though the manufacturer of this toweling has tried to cheapen this fabric beyond the point of safety as far as the filling is concerned. The fabrics could not be tendered in one place in the nature shown by the sample without becoming tender all over, and in fact, as stated before, the filling yarn in both the gray and bleached fabrics is decidedly weak. It is very easy to tear or pull apart the fabric under the blue stripe, because the filling is exposed the entire width of the stripe.

Printing With Zinc White

We are enclosing herewith a sample printed with zinc white. Kindly send us a formula for printing with zinc white and oblige. (5359)

We are of the opinion that the sample submitted, printed with zinc white, could be duplicated by printing this pigment with either blood albumen or egg albumen. Possibly the use of the latter type of albumen might have to be resorted to in order to get as little staining as possible. This could be carried out by what is known as the "albumen printing style." Solutions of albumen and gum tragacanth are prepared as follows:

Take about 35 lbs. of either blood or egg albumen; add 3 pts. of strong ammonia, and make up to 11 gals. with cold water; let stand for 12 to 25 hours; then strain.

Gum tragacanth: 17 lbs. of gum tragacanth to 45 gals. of water. Allow this to stand for at least 12 hours; then boil, with stirring, and bring to a smooth paste.

The pigment, white zinc, if the same is used in the form of a dry powder, should be first made into a paste. This can be done by working about 12 lbs. of the zinc oxide into a paste with 1 gal. of water. After preparing the printing paste, take

approximately 1½ gals. of the stock gum tragacanth paste, as mentioned above, and 1½ gals. of blood albumen paste, and anywhere from 2 to 3 qts. of zinc oxide paste. These should be mixed thoroughly, the goods printed, and steamed from 20 to 30 minutes at about 5 lbs pressure, then soaped at a temperaure of 160 to 180 deg. F. in a soap liquor containing 1 oz. soap to every 2 gals. of water.

The above process is simply a basic working procedure and would undoubtedly have to be more or less modified before being put into practical operation.

Unsuitable Mix for Woolen Yarns

We have been experiencing considerable trouble in the manufacture of black yarns. We are mailing you under separate cover a sample of gray wool colored with 10% hematine, 3% bottom chrome and 2% red tartar. We are using 65% of this black wool in our mix. We are also mailing you a sample of rovings. We are using 15% in the mix, colored the same as the above wool. Also a sample of waste of which we are using 20% in the mix, colored same as above wool; and a bobbin of the yarn we have carded and spun, showing you the strength and unevenness of this yarn. Do you think that our trouble is in coloring these yarns, in the stock that we are using, or in the percentage of mix that we are using? We are using with this a good grade of wool oil with one-half water, making a good emulsion and using a good percentage of this emulsion on the lots. (5355)

In the writer's opinion, the dyeing is all right on the samples of stock submitted. The sample of yarn is of a very poor quality. The wool is extremely dirty and should by all means be either dusted or burr picked before using. It seems advisable to take out the 15% of rovings, as it is too coarse to properly blend with the other stocks in the lot. Use 15% more of the waste, which would make 35% waste and 65% wool. For the size of yarn in question this mix should give good results.

Uneven Weight on Finisher Card

I would like to ask a question in regard to a finisher card. I have trouble in making the top spool weigh the same on both sides; the bottom spool is all right. If I set top doffer up where it belongs, say with a 28 set, it will be 12 grains heavy on the wide side of the Apperly feed. The finisher and second

breaker are belted up together. I am on all-wool stock. The card is sharp and in good working order and the clothing is in good shape. Would be very glad of any information you could give me. (5335)

It seems that the difficulty is in the doffer being improperly set to the main cylinder. Be careful to set both doffers absolutely even from end to end. Then, if it is necessary to set either doffer off or on a little to adjust the weight, be sure that each end is exactly the same. See that the bands or straps on the Apperly feed table are tight and uniform in tension.

Latch Needles Clogged with Lint

We are running a slipe wool on a 4 cut rib machine. Sample of the yarn is enclosed. We find that latch needles, sample of which we are enclosing herewith, bind latches fast from the fine fibres, causing drop stitches. When removed and the latch forced open they are all right, as the forcing the latch open has caused the fibre to drop out. Is there anything that could be done to keep latches so that they will not tighten with the fibres, and not open? (5373)

It will no doubt be very difficult to overcome this trouble entirely, but the writer believes it can be improved some by adjusting the dial in relation to the cylinder to a position where the yarn slips off the cheek of the needle before the latch starts to close. This has a tendency to take loose fibres away from the latch before it closes on them. Guides which are too low would also cause trouble of this kind. It is sometimes well to run the yarn with as much tension as possible before it passes to the needles.

Splicing Rayon

I would like to know the method used in splicing artificial silk in winding from the skein to the bobbin. (5384)

This question was submitted to the artificial silk manufacturers and five replies were received, as follows:

(1) Some kintters in winding rayon from the skein to the bottle bobbin twist the broken ends in, after the same method that is used in twisting in a raw silk warp. To assist them in getting the rayon to stick, some mills use a starch size solu-

tion, and some of them simply moisten the fingers slightly. After the splice has been made the spliced portion is put on the built-up portion of the bottle bobbin so that the rayon, in coming off the bobbin in knitting, will not pull over same. However, we are of the opinion that better results will be obtained if a weaver's knot is tied and the ends cut closely. By using this method there is not as much danger of the two ends of the rayon separating, and it does not show as large a flaw in the finished goods as a splicing does. I have never seen a machine of any kind used by any hosiery manufacturer in doing this splicing operation. It is done with the fingers by twisting the yarn together just as it is done in twisting-in a warp.

(2) I am enclosing a few strands of artificial silk with splices in them. From examining these splices I believe you can see the way it is done. Some of the knitting mills make a splice of this sort by hand, rather than tying a knot which is apt to snap off at the needles. When these splices are done correctly they will not pull out.

(3) We know of no method in general use for the splicing of artificial silk in winding from the skein to the bobbin. Attempts have been made to splice by the use of a gummy glue-like substance rolled between the fingers, but this method is in no sense of the word satisfactory and common practice is for the simple use of either the weaver's or the winder's knot.

(4) We beg to advise that we know of no machine used for this purpose; all splicing of this material is done by hand.

(5) We always advocate the tying of knots by hand. The knots should be weaver's or flat knots. On no account should bunch knots be tied as they will not pass through the needles or heddles without causing a break-out.

Wool for Paper Makers' Felts

I would like whatever information you may be able to furnish on the grade of wool that is best for paper makers' felts. I remember reading an article on this subject in an issue of your paper a long time ago, but my memory is somewhat hazy on the subject. (5349)

The article referred to by the inquirer is "Woolen Paper Makers' Felts and Jackets," by James W. Cox, Jr., textile engineer, 320 Broadway, New York, which was published serially in Textile World during 1920 and 1921. The following des-

cription of the wools used was given by Mr. Cox in the December 4, 1920, issue of TEXTILE WORLD.

As felts are usually sold under a positive guarantee to perform a specified purpose, the maker can take no chances in lax material or methods of manufacture. Strength being the first consideration, felts and jackets must be very well knit and sturdy, consequently the wool selected to make them must be suitable to this end and its strength must be maintained through manufacture. As a general rule, it might be said that the felt manufacturer must have a fairly long, very strong staple of good felting quality; yet one which will not felt so hard that it will mat down, as this would never do except in the case of a few certain types of felts and jackets.

Wools from a half blood to a braid are used. The proportionate amounts used are about 5% half-blood; 25% ⅜ blood; 55% ¼ blood; and 15% braid. Both domestic and foreign wools are employed, and sometimes they are blended. The chief foreign wools used are South American braid, English ⅜ or ¼ blood, Canadian ⅜ or ¼ blood, and South African ½ blood n small quantities. The American wools generally used are ⅜ or ¼ blood Ohio, Kentucky, Wisconsin and Michigan and Maine wools, with a small amount of territory ⅜ or ½ blood.

Practically all wools used in the industry are bought in the grease by the mills, and sorted and scoured to suit manufacturing conditions of the respective mills. The half blood is generally of a heavy felting quality and is used almost exclusively for filling on very fine closely woven second and third press felts for fine papers, and in filling in fine jackets for the same purpose.

The ⅜ blood is for filling and warp in the finer and medium grade wet felts and the warp in the above types where ½ blood filling is used. The ¼ blood is used in coarse or medium grades of felt, ordinary grades for news print and magazine papers, and in coarser grade jackets, dryer and marking felts. The braid wool is used almost exclusively in pulp felts.

The sorting of the wool is done in practically the same manner as in any woolen or worsted mill, the differences being that some fleeces, even if of correct staple and grade, are thrown out because of weakness in the fibre. These wools are sold or are used for some purpose in the mill other than for felts, as it is of the utmost importance to have all fibres strong,

particularly warp yarns. No short fibre wools would be likely to be included as length of staple must be there to assure strength in the yarn. Belly and neck wool, fribs of any kind are thrown out and sold or used for another purpose. Sorting is done quite closely and the work usually inspected, not only by the overlooker but by an overseer as well.

Wools from different localities, as well as different types, are kept entirely separate on account of the tendency to full differently. No mistake can be made in this as it would be ruinous to the size of the finished felt, not to speak of the texture and working qualities.

Finishes Given Gray Goods Before Shipment

We understand that there are a variety of gray finishes given different gray goods like print cloths, sheetings, etc., the finish apparently being given by some kind of finishing machine after the cloth comes off the loom. Just what method is used we do not know, but if you can enlighten us regarding this matter we shall be pleased to have you do so. (5332)

It is difficult to tell just what the inquirer has in mind without seeing samples of the goods showing the finish he refers to. In general, however, would say that goods like brown sheetings, etc., which are sold in the brown, are usually treated on a brushing or shearing machine, with a calender rolling machine attached to run in connection with it. This does the cleaning of the goods and also the smoothing or ironing out at the same time. The calender rolling machine has two iron rolls heated by steam and these are commonly aranged so that the top roll runs a little faster than the bottom one, to give a smoothing or ironing effect. There is a steam vapor cylinder in front of the rolls, to let a light vapor of steam on the cloth before it reaches the hot rolls. This dampens the cloth slightly, to aid in smoothing it out, on the same principle as the laundress sprinkles a handkerchief before she irons it.

When the goods are run through the calender rolling machine and smoothed out in this way, they have a much nicer feel and appearance than if they are not given this treatment. Almost any woman buying goods over the counter, and feeling of the goods which have been treated in this way, also feeling of the same goods as they came from the loom or had been put through a brushing or shearing machine without passing

through the calender rolling machine, would prefer the goods which have the softer and smoother feeling that is gained by treatment on the calender rolling machine.

In regard to print cloths, most of these cloths made at the Fall River mills, for instance, receive almost no treatment whatever after they come from the loom, except that they are often run through a trimming machine with one or two brushes on it to take off strings and hanging ends. Then they are rolled up, or folded, and shipped to the print works or bleachery. Many mills in the South that make print cloths use a brushing and calender rolling machine, the same as for brown goods, although oftentimes the calender rolling machines are used with cold rolls, since the soft feel and finish are not so essential, as the goods are to go to the converting plants instead of into the market. The machines mentioned above give practically all the finish which is given to gray or brown goods in the cloth rooms in mills both North and South, unless the goods may require some wet processes, such as starching, etc.

Shaded Wool Goods

We have been having considerable trouble with goods being shaded after finishing. Can you tell us what causes this? (5342)

Undoubtedly this trouble is due to uneven cooling of the goods after pressing and to the uneven taking up of moisture by the goods after they are finished. To get away from this difficulty many mills are installing a cooling and conditioning machine through which the goods are passed as the final process of finishing.

Finishing Cotton and Silk Mixed Goods

Would you be so kind as to give us several methods which are now employed in the dyeing, finishing and handling of cotton and silk piece goods. We are very anxious to have you describe the various kinds of cloth which are processed in the various ways. (5702)

Cotton and silk piece goods may be finished in the white, dyed in solid shades, given two-tone effects by dyeing either fibre, leaving the other white, or the two fibres may be cross-dyed in contrasting shades.

Cotton and silk piece goods are scoured and degummed in a bath of boiling soap to which may be added a small amount of soda ash, turkey red oil, and silicate of soda. Fabrics containing tussah silk are often soured with a weak solution of muriatic acid and then washed before scouring.

Dark shades are dyed without bleaching, but for whites, creams, and light shades the goods are bleached with peroxide. Either sodium or hydrogen peroxide may be employed. In either case the bath is made slightly alkaline with sodium silicate and is maintained at about 180 deg. F. Tussah silk will require a stronger bleach and a longer time than Canton.

Silk and cotton fabrics may be dyed with direct, developed, acid, basic, sulphur, and vat dyes. Certain of the direct colors will dye both the cotton and silk and these colors are usually employed for producing solid shades. The addition of glauber salt to the bath will cause these direct colors to go on the cotton more than on the silk, and the addition of soap to the liquor likewise retards the absorption of the dye by the silk. Other direct colors have little or no affinity for silk, especially when applied in a bath made alkaline with soap and soda ash; these colors are employed when it is desirable to dye the cotton, leaving the silk white.

With the direct colors dark shades are dyed at about 180 deg. F., and light shades at about 150 deg. F. The developed colors are dyed in the same way as the directs and then diazotized, developed, and soaped in the ordinary manner. Acid colors applied in a warm bath which has been acidified with sulphuric acid will dye the silk without coloring the cotton. Two-color effects may be obtained by either the one or two-bath method by using the acid colors for dyeing the silk, and the direct colors for the cotton. Basic colors have a good affinity for silk, but at present their chief use is for topping when brilliant shades are required. The sulphur and vat colors are used for producing fast shades, special methods of application being necessary.

To improve the luster and give scroop, cotton and silk goods after dyeing are usually treated with a weak solution of acetic or formic acid. Depending upon the construction of the fabric, either jigs or reel machines are used for scouring, bleaching, and dyeing cotton and silk mixtures; goods such as pongees and satins which have a firm construction may be run on the

jig; light and fragile fabrics such as marquisettes and crepes are best processed in rope form on the reel machine.

Goods having a firm construction may be dried on revolving cans or cylinders or in cell driers heated with warm air; extremely fragile goods which must receive little or no tension are centrifuged and then dried on continuous apron driers heated with steam coils.

The method of finishing depends upon the construction of the goods and the appearance and feel desired. Many fabrics need only to be softened with a little turkey red oil or sulphonated olive oil and then stretched to width on a tenter. When cotton and silk fabrics must be filled or stiffened, opaque starches should be avoided as these will decrease the luster. There are on the market some specially treated dextrines and transparent gums which are preferable for this class of work. These are usually applied on an ordinary two-bowl mangle, and a small amound of glucose or glycerine is sometimes added to the mixture. Some classes of cotton and silk fabrics are improved in finish by a cold calendering at medium pressure.

Warping for Narrow Fabrics

We would appreciate your giving us some assistance on warping. Our beams are 16 in. diameter heads, 4⅜ in. between heads. The warps are made flat. We use 16/2, 20/2 and 24/2 yarn on tubes. We use a "V" creel and the warps contain from 80 to 220 threads. The beam is driven with a leather covered friction pulley. We have been unable so far to make a warp which will, on unwinding, show even length on all threads, although we have tried various contrivances between the creel and the beam. What can you suggest that will give uniform lengths on warp threads? (5371)

The trouble complained of is not uncommon with warps made by the friction drive principle. The irregularity arises mostly from the difficulty experienced in uniformly distributing the stock over the entire face of the beam without the threads mounting in ridges, thereby increasing the circumference at the point of distribution of some threads over others. This condition is aggravated when the number of threads in the warp are few and scattered, and where the stock is coarse. It is not so apparent in fine yarns, or where the threads are crowded, and hug close together. The trouble may also arise from an erratic delivery of yarn from the individual tubes at the creel, more particularly when full tubes and tubes nearly

run out are working together. This should be checked as far as possible by the use of proper drop weights or springs over each tube.

The warping machine should not be allowed to run so fast that this erratic spool delivery is encouraged or aggravated. It is advisable to pass the entire group of warp threads over and under a series of bars as often as is practicable, commensurate with the strength of the yarn and speed of the warper.

Where the warp is delivered from the beam at the back of the loom in a straight line with the harness, and where the distance from the warp beam to the weaving line is very short, any irregularity in the length of the individual threads is very noticeable and will often interfere with the clearness of the shed. It will put an uneven breaking strain on some of them. If instead of running the warp in a direct line with the harness, arrangements can be made to carry it upward for a distance, and bring it down again over and under rolls, any irregularity which may have crept in will be distributed over a longer length. A marked improvement in the uniformity of the tension of the different threads will be the result.

Quantity of Water for Bleachery

Do you have any figures regarding the quantity of water required to bleach and finish a heavy material like 10 oz. duck, doing 5,000 yds. per day? I would like to know the approximate quantity of water required? (5394)

On heavy goods of the type specified we would figure on water requirements of from 80,000 to 90,000 gals. per day. It is possible that you might get along with 75,000 gals. per day, but heavy cotton duck must be well washed, and we would recommend from 80,000 to 90,000 gals. when taking into consideration the matter of final washing after the bleaching process.

Break in Heel of Half Hose

I am enclosing herewith one half hose produced on an 84 needle machine. You will note break at point of heel gore. Machines are in good condition. I am wondering if there is not some adjustment that will stop this particular trouble. (5386)

It looks as though the heel yarn, which has a cotton along with the woolen, has cut or broken the woolen leg yarn which has no cotton to help strengthen it. This end of the gore is

the weakest point in seamless stockings and often has broken stitches. One suggestion we can offer is that the heel stitch be loosened a little, but we fear that may loosen up the fabric too much to suit you.

Another suggesion is that you look at the pattern chain and see if there are as many links for the second half of the heel as for the first. Possibly, the second half has one link less, and adding one link may help by carrying the white woolen and cotton further along.

Eliminating Water Mangle

We propose to eliminate the operation of passing the goods that come from the bleachery through the water mangles. In other words, it is proposed to run the goods direct from the bleachery to the drying room. I am under the impression that this practice was followed in the past, and I am wondering whether any of the large bleacheries are using this abbreviated method. Furthermore, it would be interesting to know whether such a system could be used in connection with goods that are to be dyed, or must it be confined solely to white goods. It would seem that unless the bleaching chemicals are thoroughly washed out, the dyeing process would not be a total success and perhaps streaks and other defects would show on the finished goods. Your comments on the above problem will prove most helpful. (5336)

In eliminating the operation of passing goods from the bleach house through water mangles, the inquirer is not attempting to accomplish anything which is new or unusual. In fact, a great many concerns handling lightweight lawns, organdies, voiles, etc., pass their goods directly from scutchers onto drying machines. The question of whether a water mangle should be used or not is decidedly open to discussion. It is a well-known fact, however, that certain grades of medium weight and heavy goods cannot be suitably handled, or the proper finish given, without being water mangled. This particularly applies to dyed goods. If the writer were considering such a move he would confine the elimination of the water mangle to such goods as voiles, lawns and organdies.

There is one angle to eliminating water mangles which a great many persons, in their enthusiasm for the idea of cutting out one machine, are apt to lose sight of; that is the fact that if goods are not properly squeezed before the drying operation the efficiency of the drying cylinder machine is materially affected. Goods can be delivered to a drying machine from a

water mangle with considerably less moisture content than they can be delivered from a bleach house squeeze and scutch; particularly if they have been allowed to lie in the bins for any length of time and seepage has affected the bottom or lower half of the bin.

Wear on Spinning Frame Tapes

Tapes on our spinning frames wear out too fast. They break in two at the stitched points and look very dirty, as shown by sample enclosed herewith. There is no doubt that the tapes touch some parts of the machinery. Can you say what is a reasonable wear for tapes? We would appreciate it very much if you could advise us how to overcome this trouble. We are told that the overlapped joints of the tapes must run against the whirls like sketch, which is contrary to the style in which the overlapped joints on leather belting are made to run. Our tapes are 5/8 in. wide, 3/64 in. thick. (5397)

Practically all band and tape troubles are in the joint, and as yet no one seems to have developed a satisfactory solution. The reason for running tapes with the open ends overlapping as you indicate is that, if the tape slips on the drum, the tendency is for the end to be smoothed down instead of out.

We suggest that you use a better grade of sewing thread, say some polished thread instead of the ply yarn you are now using. In addition, we also suggest that you use four lines, or rows, of stitching instead of three as in the tape, and that you readjust your sewing machine to give as many as eight stitches per inch. Your tape appears to be sewn with about six stitches per inch.

Your tape is soiled, but so is any tape after a few weeks of service, for there is much dust and some oil about the spinning frame. It does not appear to have been in frequent contact with adjacent parts of the frame, for it does not show any serious abrasion.

Bleaching Cotton Waste and Linters

I would like to ask you for the approximate cost of installing, and just what equipment I would require, to bleach 6,000 lbs. of cotton waste and linters daily, for use as absorbent cotton. What should be the cost of bleaching per pound? (5347)

The approximate cost of installing equipment to bleach and dry a daily production of 6,000 lbs. of cotton waste and linters

would be $40,000 to $45,000. The equipment would consist of three special raw stock bleaching kiers, with three cement bleaching cisterns and the necessary pumps for pumping the chlorine liquor, two 3,000 lb. capacity raw stock washers and one large raw stock dryer. The cost of bleaching should not be more than 2c to 2½c per lb. including labor and material, overhead and depreciation. The cost of bleaching and drying would be about 4c to 4½c per lb., including labor and material, overhead and depreciation.

It is very probable that the inquirer might find suitable equipment on the second-hand market. A great many plants were equipped to handle this particular product during the war as a basis for guncotton or nitrocellulose, and at least four or five of these plants have ceased operations. The writer knows of some of this equipment being picked up by raw stock bleachers during the last eight or ten months. It is probable that an advertisement in the Clearing House columns of TEXTILE WORLD would bring gratifying results, although the production of 6,000 lbs. is a good size unit, which would require a large capacity drying machine and one or two large capacity washers.

Yarn for Hosiery Heels and Toes

I intend to start very soon in the manufacture of ladies' 240 needle high class hosiery, disposing of the output direct to the consumer. As I desire to market an exceptionally high class product, irrespective of the cost, I intend using two ends 90/3 Saks cotton yarn of the highest class in the heels and toes. A friend of mine, who is a cotton yarn salesman, tells me that I should use two ends 60/2, as the two ends 90/3 yarn will produce stiff heels and toes that will find no favor with the wearer. While this may be true, I have in mind an advertisement I have seen of ladies' silk hosiery wherein is stated that the heels and toes have eight strands of lisle. Will you please favor me with the benefit of your experience and inform me, at your convenience, if the two ends 90/3 Saks cotton yarn produce satisfactory heels and toes? Also, if the extra wear to be obtained using two ends 90/3 Saks cotton yarn as compared with two ends 60/2 Saks cotton yarn is worth the difference in the price of the two counts? (5413)

From several personal tests the writer has become firmly convinced that the wearing qualities of heels and toes increase with the number of strands used. In my long experience I

have never found anything to the contrary. The matter of stiffness is wholly determined by the length of stitch used, and the number of turns of twist in the yarn used. Without doubt the wearer can afford to pay the difference in the price of the two counts.

Uneven Nap on Underwear Fabric

We are experiencing considerable trouble in getting a satisfactory nap on one of our fabrics, a sample of which we are enclosing. We would like very much to have you examine this piece of fabric and offer any suggestions as to how this unevenness of nap can be eliminated; also the pin holes which appear near the silk stripe in this fabric. (5405)

In the writer's judgment the trouble is entirely due to the construction. The pin holes are caused by the silk being too tight. I would suggest trying to run the silk a little slacker while knitting the fabric. Examine the fabric carefully and you will note that the uneven napping is right along each stripe. The trouble here is due to the tautness of the silk raising the wool higher and therefore allowing the highest point to come in contact with the napper with greater force than between the silk stripes, giving you a higher nap at this point.

Finishing Cotton and Silk Mixed Goods

I am enclosing two samples and would greatly appreciate it if you could give me some information in regard to the preparing, dyeing and finishing of these goods. The trade requires a high luster on both qualities. The attached samples are considered good. (5366)

The samples referred to are both half-silk fabrics with cotton warp and silk filling. In sample No. 1 the filling is Canton silk; in No. 2, tussah silk. The treatment of the two fabrics should be similar except that the cloth containing tussah silk requires a more stringent boiling, degumming and bleaching. In general, the processes to be employed are as follows: (1) boiling and degumming; (2) bleaching; (3) dyeing; (4) finishing.

The first three operations may be performed in the open width on an ordinary jig constructed of soapstone with monel metal rolls. Usually, however, the boiling is done in an open

width washer or specially designed kier. Cisterns of wood or concrete equipped with lead heating coils are often used for bleaching. The type of equipment depends largely upon personal preferences. In any case a thorough boiling-out is necessary to free the cloth of impurities and to remove the outer covering of sericin from the silk fibres. On the other hand, too harsh a treatment must be avoided as strong alkali will tend to lessen the luster or even destroy the silk. For boiling and degumming tussah silk filled fabrics the following procedure should prove satisfactory:

(1) Dissolve in each 100 gals of water
  (a) 5 lbs. olive oil or red oil soap (50% solids)
  (b) 5 lbs. turkey red oil (50% solids)
  (c) 1 lb. soda ash

(2) Work the cloth in the solution at the boil until the sericin is removed (6 to 8 ends on jig).

(3) Wash thoroughly with hot water.

In the case of the Canton silk the soda ash should be omitted from the boiling--off liquor and the time of treatment may be shortened.

Silk filled goods are almost invariably bleached with hydrogen peroxide. Hydrogen peroxide may be purchased in solutions of various strength or it may be prepared as follows:

Add slowly 6 gals. vitriol to 70 gals. of cold water; cool with 200 lbs. of ice; add slowly with constant stirring 60 lbs. of sodium peroxide. This will yield 100 gals. of hydrogen peroxide at a strength of approximately 12 volume.

In bleaching on the jigs for 1,000 yds. of tussah filled cloth, 50 gals. of water are required; to this are added 5 gals. of 12 volume peroxide and enough sodium silicate to make the solution slightly alkaline (about 1 pt. of 42 deg. Be. silicate); the bath is heated to 200 deg. F., and the cloth given one run in the liquor; the same quantities of peroxide and silicate are next added and the fabric given five ends through this solution; then wash by running several times through hot water. For Canton silks the amount of peroxide may be reduced by one-third.

To obtain a pure white on tussah silk it will be found necessary to repeat the peroxide treatment, but when the goods are to be dyed one bleach is sufficient. When a kier with a circulation system is used for bleaching, the peroxide should be diluted to a strength of about 2 volumes; the temperature

maintained at 175 to 185 deg. F.; and the bleach continued until a satisfactory shade is obtained (3 to 6 hours). Highly concentrated solutions of peroxide must be avoided or tendering of the fabric will result. Likewise the presence of catalytic agents such as copper or iron must be guarded against, as these will cause over-energetic bleaching.

Except in special cases, silk filled fabrics are dyed in the ordinary jig. Judicious selection of the dyestuffs enables the dyer to produce a variety of effects. For example, solid tones may be produced by employing a direct color to dye the cotton, together with an acid color to tone the silk. Again, brightness may be obtained by topping with basic colors. Two-tone effects are produced by selecting acid colors, with little affinity for cotton, to dye the silk filling, and substantive colors of a different shade to dye the cotton warp. Likewise the silk may be dyed and the cotton left white by using acid colors with the addition of soap. Jasper shades are obtained by dyeing in the usual manner with black sulphur colors to which glue has been added.

After dyeing, these fabrics are usually treated with a weak solution of acetic acid to increase the scroop, dryed on cans, and finally steamed and stretched to width on a gas-heated tenter. Many variations to this process are practiced, but the method described should give the results desired.

Cashmere Finish on Jersey Cloth

Our selling agents would like a cashmere finish like the enclosed woven fabric on knitted wool jersey coating, if such is possible. If such a finish can be gotten on the wool jersey coating, we would like very much to get it. (5368)

To get a finish on jersey cloth similar to the samples submitted, we would suggest that this fabric be knitted as fine as possible, giving plenty of width to allow fulling to overcome the usual objection of too much elasticity in width. This can only be done by giving the finisher all the width possible. Loss in length will produce a firm lofty fabric without a raggy, slazy effect.

Full in length and width to the desired weight with a mixture of 5 ozs. of Paroxan and 3 ozs. palm oil soap, standing about 3½ to 4½ deg. Tw.; use cold. When the goods have run about half an hour, it would be well to shake them out

frequently, changing their position as much as possible. Scour half an hour in a good bath of soap, and wash off thirty-five or forty-five minutes; extract, split and give a light run on the napper to straighten or level the lumpy face after fulling; dry, shear, tenter and press.

A good suggestion is to full the fabric half-way, take out, extract, split and give a light napping; then tack the piece and resume fulling; scour, spit and straighten on teasle, dry shear, tenter, and press as suggested.

Analysis of Wool

Kindly advise a method to determine potash in mohair. Please recommend a chemical book where a complete analysis of wool is demonstrated. I have Harper's "Introduction to Textile Chemistry" and on page 19 he mentions that this book does not teach a complete analysis. (5375)

We do not believe there is a book giving a procedure applicable to the analysis of wool. If the inquirer is experienced in quantitative chemical analyses, the usual methods found in text books, with few modifications, can be used for covering such an analysis as is desired.

For the determination of potash in mohair, the regular method for potash determination can be applied with certain modifications for this special case. In brief, this would consist of igniting the mohair at a low heat to prevent alkali volatilization; then treating the mineral residue with a few cubic centimeters of water and one or two cc. of concentrated sulphuric acid; then adding two or three cc. of chemically pure hydrofluoric acid. Evaporate to dryness, gently ignite to expel most of the acids, then take up the residue with a few cubic centimeters of water and hydrochloric acid. Proceed by usual well known methods of analysis for the removal of iron, alumina, calcium and magnesium salts, and finally obtain mixed chlorides of sodium and potassium. These are purified and the potassium precipitated and weighed as potassium chlorplatinate.

We would suggest that the inquirer refer to some good standard book on analytical chemistry. Take for example, "Quantitative Analyses, Vol. II" by Treadwell & Hall. Page 397 of this volume gives a method which, with certain modifications, anyone trained in analytical chemistry can easily

adapt for the determination of potash in such materials as mohair or wool. The fourth edition of Matthew's "Textile Fibres," Chapter V, would probably give the inquirer some helpful information.

We might say at this point that if the inquirer is not experienced in analytical chemistry, it would be far better for him to employ a competent chemist to make this analysis instead of attempting to make the potash determination himself, as it is a rather fussy determination to handle unless worked by an experienced chemist.

Tuck Stitches and Holes

I would like very much to get some information with regard to the following: On five cut rib knitting machines, using both all-wool and union mule spun yarn, weighing from 43 to 47 grains to 20 yards, we get some tuck stitches in the cloth. If we increase the tension on the take-up it makes holes in the cloth. We also draw the dial needles as far back as possible, but presume this also has a tendency to make holes by putting increased strain on the yarn. Are these tuck stitches caused by the dial needle loop not being drawn down sufficiently so that when the dial needle again comes forward it re-enters the old loop? Is there any other way to overcome tuck stitches? Will increasing the length of the dial stitch by drawing the dial needle further back tend to make the cloth lighter? Does the dial needle simply stretch the yarn to make a longer stitch, or does it draw some new yarn through the hooks which precede it? In order to tighten or loosen the stitch is it customary to make the necessary adjustment with the cylinder cam, or do most knitters raise or lower the dial to make slight alterations? What are some of the most common mechanical defects or maladjustments which tend to make holes in the cloth? I will appreciate very much some help on the questions raised in the foregoing. (5372)

The important question of this group regarding the elimination of tuck stitches cannot be definitely answered without an opportunity to see the machines working, but the possible causes are discussed in the following:

The yarn size seems well enough suited to the machines. If the dial cams and the cylinder cams are so timed that both draw a loop at the same time this might cause holes. The dial cams would need to be readjusted in position so that the dial needles draw their loop after the cylinder needles have

completed their stitch. However, this is an unusual condition and not likely to be the cause of the stitch cutting.

If the tuck stitches appear on one side of the tube and the holes on the other side of the tube after an increase in tension, it would indicate that the dial was not level. When the dial is not level a longer stitch is formed on the high side, which makes a slightly longer portion of cloth. This reduces the tension on that side and so would allow tuck stitches at times. The lower side of the dial makes shorter stitches and so less length of cloth, and this cloth carries the larger portion of the tension. Thus an increase in tension comes mostly on the cloth where the dial is low and so tends to break the stitches there. Remedy this trouble by leveling the dial.

On large machines the dial is sometimes off-center. This causes the dial to be nearer the cylinder needles on one side than on the other. The results are much like those prevailing when the dial is not level. The troubles would likely all appear at one side of the machine when tucking and at the other when making holes.

Drawing the dial needles as far in as possible would have a tendency to break stitches, due to the long length of yarn needed. On machines with swing cams or welt cams, tuck stitches sometimes result from poorly adjusted swing cams. If the swing cam does not force the needle far enough out, so that the latch spoon goes well beyond the loop, there are times when the loop will catch on the latch spoon and produce a tuck. (This is more apt to occur in conjunction with slight tension or when a tight stitch is being drawn.) The remedy for this is to be sure that the dial needles are forced well out at the yarn guide.

If the cylinder loop is small as compared with the dial loop, it may be that the cylinder stitches are carrying most of the tension and that the dial needles tuck due to lack of tension. With too little tension the loops may catch on the latch spoons as just described and make a tuck. Remedy this trouble by drawing a shorter dial loop. As the cylinder loops are generally the outside of the fabric, the most common practice is to have them slightly longer than the dial loops if there is to be any difference.

Generally speaking, lengthening the stitch will lighten the fabric. However, when lengthening one stitch it is good practice to lengthen the other. This keeps both sides of the

fabric more nearly in proportion. If only one stitch cam is to be changed the cylinder cam seems more desirable than the dial cam.

Doubtless both cylinder and dial needles stretch the yarn as they draw loops. This action, which is eliminated in spring needle machines, is supposed to account for latch needle fabrics being less desirable than spring needle fabrics. The correct practice is to have hte cylinder needle draw its loop over the dial needle while the latter is not knitting. Then just as the cylinder needle starts to rise, the dial needle starts drawing its new loop. So the dial needle draws yarn of the cylinder needle loop from which to form its loop. That is, the dial needle does not draw from adjacent dial needles but from the adjacent cylinder needles. The cylinder stitch is purposely drawn longer than desired in order that it may give up some to the dial needle.

For similar fabrics, changing the dial is undesirable. The dial should be set just high enough to let the heaviest part of the cloth pass freely between it and the cylinder, and then the stitch should be adjusted by means of the cylinder and dial cams.

Common causes for defects are as follows: Too little tension, tucking; too much tension, holes; dial not level, either tucking or holes, possibly both; stitch too tight, holes; bad needles, tucking or holes, or needle streaks. Bad needles have often caused tucking at irregular intervals probably due to very slight tension variations. At times there is no apparent defect about the needles. See if tucking occurs at the same needles each time.

Finishing Rayon Lining

I am enclosing sample of cloth and would like to have information on finishing this class of material. I would like to know what would be required in the line of machinery to handle this cloth? (5390)

This cloth has a rayon face and cotton back. It is a reversed twill of a silesia construction for linings, designed to take the place of silk lining in overcoats and such garments. It is a well executed piece of work, and has been both well manufactured and well finished. The actual layout of machinery for finishing would depend on production. It has very evi-

dently been singed over a four- or six-burner gas singer and then treated with some detergent product to remove sizing material, etc. Following this it has been scoured in either an open width continuous machine or on jigs, after which it has been treated, washed and dried.

The dyeing is done on dye jigs, after which goods are thoroughly washed and dried, given the softening or slight conditioning ingredients and tentered over a range consisting of six to eight cylinders, 90 ft. tenter with hot air heating system and winder, conditioned, and run over a 3-roll silk finishing calender with two felt paper rolls and a heated chilled iron roll. The equipment to handle the finishing of this line of goods would be quite expensive, and unless the inquirer had at least 12,000 to 15,000 lbs. per day the plant could not be operated economically or practically.

Scouring Woolen Goods

I am sending you samples of woolen goods on which I want your advice in scouring. Will you kindly describe the handling of such fabrics and give details of the methods I should follow. (5407)

The scouring of these goods depends altogether on the finish required. If a coarse crash feel is to be obtained, a formula would be used quite different from the one selected if a soft woolen handle were desired. For the crash feel a red oil or even a cottonseed oil soap should be used, as there is not much body in either to soften the fabric. Three ounces of soap to the gallon and 3 ozs. of alkali, boiled up together for two hours and used when cold, about 6 pailfuls to each piece, would be sufficient to cleanse the goods. Fifteen minutes' run in the soap and one hour rinse in cold water would be the time required.

For a soft woolly handle, five ounces to the gallon of a good palm oil soap and three ounces of alkali, boiled together for at least four hours would both cleanse and soften, but instead of fifteen minutes in soap the goods should be run thirty minutes. If, the oil or dirt in the goods should overcome the soap, the first or dirty lot should be run off and about three pailfuls to the piece added, or enough to work up a good heavy lather. This is necessary to insure a thorough cleansing.

The goods are put in the washer just as they come from the

loom and no water added. The liquid soap is put right on the dry goods. All of the soap that is going to be put in the washer should be put in while the washer is standing (after the piece ends have been sewed together and run around once to straighten them out). This prevents cloudy places as the soap does not attack the goods in patches. When the goods have been run the allotted time in the soap the cold water is turned on. Some men use warm water but this is not at all necessary if the soap has done its work properly. One hour in water is generally sufficient if the supply is good. Piece dyes require from 15 to 30 minutes longer.

Effect of Inorganic Salts on Cotton

We are desirous of obtaining information on the effect of inorganic salts on cotton and cotton fabrics. We have lately acquired some evidence that many salts have a tendering effect on cotton fabrics, especially when the fabric is impregnated with a solution and then the material is thoroughly dried. Can you refer us to literature which gives a summary of the action of salts on the strength of cotton fabrics or tell us where we might look for such information. (5409)

There are a number of inorganic salts that have a marked tendering action on the cotton fibre if solutions of these salts are allowed to dry on the fibre at high temperatures. The principal salts that have this tendering action are calcium chloride, magnesium chloride, potassium bisulphate, zinc chloride, sodium bisulphate, aluminum chloride. The above-mentioned salts when heated to high temperatures tend to decompose, liberating more or less free hydrochloric acid, which being a strong mineral acid has a marked corrosive effect on the cotton. In the case of the sodium bisulphate and potassium bisulphate, these are acid salts or in another way can be looked upon as a mixture of normal sodium sulphate and potassium sulphate with a certain amount of free sulphuric acid. Of course the tendering action in this case is due to sulphuric acid. There are other salts that also produce tendering action on the cotton fibre. These are salts that are of strong oxidizing character and are used largely in the printing industry.

Such salts as chromates and permanganates readily attack cotton under certain conditions, such as high temperature or

steam pressure. Sodium sulphide, under certain conditions will have a marked tendering action on cotton. This action usually requires more or less time before any appreciable tendering is noted. The action of the sodium sulphide is undoubtedly due to a slow oxidation of this compound into sulphuric acid. This type of tendering is chiefly encountered in the dyeing of sulpur colors.

We know of no better book for you to refer to for obtaining information on the action of chemicals on cotton fibre and other textile fibres than Matthew's "Textile Fibres." This volume can be obtained from our Book Department which is located at the New York office of TEXTILE WORLD.

Removing Odor of Smoke from Wool

We are sending sample of wool on which you will notice a very smoky odor. This is due to the stock being subjected to smoke in a fire. Is there any way of overcoming the smell? The stock can be dyed some other shade. (5410)

There appears to be no practical method for removing the smoky odor that this wool contains other than to expose it for an indefinite time to the free access of air. This might be done in some well ventilated loft or shed, but we believe the time necessary would not permit it to be a paying proposition if the amount of wool is large.

Since the stock does not have to remain the present shade, we think that it would be better to return it to the dyehouse and have it redyed some other shade. The dyeing operation would remove the odor. It might be possible to effect the removal of much if not all the odor by rescouring the wool, but the cost might be just as well put to redyeing, with a certainty of having a good job.

Changing Travelers

Will you kindly advise us how often the travelers should be changed on ring spinning frames? We would like to get the opinion of an experienced mill man on this matter. (5419)

The following information on this subject was given by a very capable mill superintendent in an article which appeared in TEXTILE WORLD: On fine work, say from 50s upward, the travelers will probably change themselves often enough so

that it will not be necessary to change them all at one time periodically. And yet if the work runs badly a whole new set will aid much to tide over the difficulty. On medium and coarse counts it really does not pay to let the travelers wear out one by one.

On medium counts, 20s to 40s, it is best to change all of the travelers at one time, once in three weeks, or once per month anyway. If this is not done the work will gradually spin worse, and the quality of the yarn will deteriorate. If travelers are changed every three or four weeks, the good running work will compensate for much more than the cost of the additional travelers used.

On coarse work, from 20s down, it is best to change the travelers more frequently, say every two weeks or so. If allowed to run longer, it will probably cost the plant much more than the cost of the change for both the new travelers and the labor. If the change of travelers is too slow, and the travelers are wasted by the handful, there might be something to say adversely, but even this will pay rather than make bad work. Travelers can be changed very fast if the help are properly trained.

Warping for Georgette Crepe

Please give me information on how to warp georgette crepe on a Swiss warper, straight and reverse twist, 13/15 denier, 2 end georgette, 70 turns twist, both right and reverse. The overseer of weaving wants the warp all on the same beam, that is, patterned 2 and 2. I have no trouble in running either hand, but simply can't run them together 2 and 2 without twisting together in coming off and breaking out so badly that the warp is worthless. Have tried running them separate and then putting them together on a direct warper. Have tried to run the silk in ribbons on reel, not traversing on reel; but up to this writing have done nothing to make a good warp. Ends in warp wanted are 1860 straight twist, 1860 reverse twist. We want both on same beam, 45 in. wide. The question is how is georgette crepe warped and prepared for the loom, on one beam or on two beams warped separately and then put together? We have Swiss warping machines. If this went to the loom in two warps, reverse on one beam and straight on the other, would the goods be O. K.? Would it affect the crepe effect when finished? (5439)

In reference to making georgette crepe on Swiss warp mills, we would recommend the following: Do not use more than 250 to 300 bobbins, banking them up in the center of creel. Use the same count reed in warping as you use on the loom, puting the ends in one right twist and one left twist per dent, instead of two ends of the same twist.

Remove the buttons from creel and place a piece of felt over the bobbin pins in order to give you a greater tension on the bobbins; in other words the bobbins should pull hard. Keep your ends tight throughout the whole process and you will have no trouble with them twisting.

Your idea of making two warps, one with left and one with right twist is unnecessary and might cause you trouble in the weaving in the event of a pick-out. By following the method described above you should have no trouble.

Machinery for Full-Fashioned Hose

I would like some general information as to the machinery required to make full fashioned hose. Are any circular machines used in the manufacturing or can they be made over into such machines? Is highly skilled labor required; that is, does it require considerable time before one can be taught to operate the machines successfully? (5406)

The common full fashioned hose is made on a special type of flat machines. Each stocking requires two machines, one for the leg and heel, and one for the foot, including the toe. These machines are very similar but they are set up to go through different motions. In the usual factory, the machines are grouped in sets of four, three for legs and one for feet.

The loops of the leg and heel are transferred to a series of points on a straight bar and later these loops are put on the needles of the footing machine, so that the wales of the leg are continued down over the instep with no apparent break or change in the fabric. The loops at the end of the toe and under the heel are joined in pairs by the operation of looping. The rest of the stocking is completed by a sewing machine seam.

The knitting is quite a highly specialized trade and competent operators (men) earn a very good wage. Even the transferring, looping and seaming require considerable practice and so these operators earn good wages for girls.

Another full fashioned machine is the type known as the Burson machine, designed and made in Rockford, Ill., for the Burson hosiery. There are several concerns using machines of this general type. It is a two bed, flat machine, which knits a tube by knitting down one bed and back the other. It starts the stocking at the toe and widens (rather than narows) to give the desired shape. These machines are quite thoroughly covered by patents and are not sold, so are not available to the public. The operatives should hvae a certain skill, but probably not that of the regular full fashioned operators. The wages paid are not as high as those for full fashioned work.

There is no circular machine to make full fashioned stockings and at present there is no method of adapting circular machines to full fashioned work.

Defects in Knitted Web

We are sending you two samples of knitted web from two of our knitting machines and wish you would tell us the reason why the knitting appears as shown. We have made adjustment of the machines and cannot get results. Your advice along this line will be much appreciated. The samples are marked No. 1 and No. 2. (5408)

These machines are evidently not being run by a real knitter and it will probably be necessary to get someone more familiar with knitting machines to put them in shape. A few of the things that might cause the defects shown are as follows: In sample No. 1, there is a heavy end on one feed and this may account for the tuck stitches, as the cloth is being knitted very loose and the heavy yarn may not cast off as it should. Sample No. 2 is even worse and there are probably different kinds of sizes of needles in the machine. The latches may be stiff or loose so that they do not stay on the hook, or some of the latches may be longer than others, causing tuck stitches.

The cloth is so loose on both machines that it is hard to make the machine run properly and the take-up may not be taking the cloth fast enough, or it may not work evenly and steadily. The chances are that there are a lot more things the matter with the machines as the cloth, especially No. 2, is about as bad as it could be. It hardly seems possible that the person who let the machines get into this condition can bring them back.

Rayon Stocking Crinkles at Ankle

We have secured a fibre stocking which does not crinkle at the ankle when stretched out. We have been trying to produce that effect but have been unable to do so. We are sending you two types of ladies' rayon hose, one of which you will note has a firmly knit ankle and which does not crinkle or look wavy when stretched in the ankle; the other one does have this undesirable feature. Any advice you can give us regarding how to overcome this crinkly or wavy appearance in the ankle will be appreciated. (5815)

If you will examine the length of stitches in the two samples submitted you will find that the stitch in the stocking which crinkles has a lengh of about twice as much in the ankle as you will find in the firmly knit ankle. First, we believe you will need to shorten the stitch in the ankle as much as you can. We believe this is all that is necessary to overcome the trouble, but if the wavy look does not entirely disappear we recommend that you ravel and test the rayon to be sure you have the proper count. Both samples were knit on the same type machine and you should find it a simple matter to duplicate the good stocking.

Finishing Bag Goods

Kindly inform me through your department of Questions and Answers, what equipment is necessary for the bleaching, finishing and put-up of bag cloth. In other words, I wish to know how this style of work is produced today and what machinery is necessary for satisfactory results, from the gray cloth to completion. (5364)

Taking as a basis a unit of equipment to finish 40,000 yards per day of goods weighing about 4 yds. to the pound, on a 36 in. and 37½ in. gray width basis, the inquirer would need the following equipment:

Two sewing machines, power driven, for sewing together in a continuous run the ends of the cuts of gray goods.

One 6 ft. saturating machine of the bleach house washer type.

Two 5-ton capacity kiers, with large manholes so that the mechanical kier piling device may be used.

Three bleach house washers, 10 ft. type.

Three water squeezers.

Two sour squeezers.

One chemic squeezer, with piling machines of the proper capacity for chemic and acid treatments.

The inquirer would also require the necessary wrought iron or boiler metal tanks for mixing caustic, etc., for kier charges, and cement and wooden bins for storing goods during the various processes of the bleaching, and for storing up the goods after the bleaching is complete and before mangling. He would also need apparatus for making bleaching liquor, that is, either agitators and tanks for chloride of lime, or mixing tanks for storing chlorine liquor fixed with soda ash. Acid storage tanks would also be required made from wood, lead-lined on the inner surface.

After bleaching the goods would be picked up in the rope or strand form and run through the following range:

One ceiling type scutcher, 44 in. wide.

One 5-roll water mangle with two brass rolls and three husk or combination rolls, followed by six to ten drying cylinders and a compensator.

One so-called dry mangle for flattening the threads and putting them in condition to take the backfilled mixture more readily. This mangle would have a middle brass roll about 12 in. diameter, with an iron body and brass shell covering about 1 in. thick, and two husk or combination rolls 20 in. diameter.

One 30 ft. tenter to stretch and even up the goods before filling.

One of the latest type Tommy Dodd or backfilling mangles, such as is used for filling heavily stuffed or filled fabrics, with friction roller, double oscillating doctors and agitator rolls in starch box.

After the Tommy Dodd the goods would be passed over a drying machine of about 42 cylinders and laid down by a folding or plaiting device, ready for the calendering and finishing. After drying over a drying machine they should be conditioned.

The calender is usually a 5-roll installation of very heavy construction, with a 16 in. chilled iron driving roll and a 14 in. upper intermediate chilled iron roll, both steam-heated, and three combination rolls about 20 in. diameter. The calender should be fitted with attachments for receiving the goods in batch form and have a 2-drum heavy batcher for winding the goods up as finished. Some concerns use a chasing rigging on their calenders for the higher grades of bag goods, and in this case it is fitted to the calender and a special single-drum

batching apparatus is used. From here the goods are ready to make up into bags.

The above equipment is figured for use in the bleach house with what is known as a single-boil caustic syetem. It is possible to finish goods within 1½ to 1 in. of gray width on the above range on a 36 in. basis. Forty-four in. machinery throughout for a maximum width of 39 in. gray goods would be large enough for all requirements.

Colored Marks in Bleached Goods

We are sending you a piece of material knit from 2/20s which is peroxide bleached and sulphur bleached. You will notice that this is full of marks. We believe that some are burrs in the stock and others look like different colored materials knit in, although we are unable to account for this condition. We would like your opinion and advice on same. (5442)

The marks complained of are due to colored flyings and uneven yarn causing an uneven effect. The colored flyings are incorporated in the yarn either during spinning or while knitting. The colored lint flying about is caught by the white yarn and knitted into the garment. If you are using colored yarn at your mill, this is the seat of the trouble and steps for isolating the colored from the white work must be taken.

If you buy the yarns, take this matter up with the firm you are buying from and you will no doubt learn that they are spinning colored yarns and white yarns close together, which will explain the presence of the colored threads in your bleached fabric. This trouble must be eliminated at its source.

Spots in Dyed Yarn

We have experienced some trouble in some yarn that has been returned to us showing streaks or spots that we cannot account for. We are unable to assign any reason for the yarn showing these spots and we would like to know if you could help us get to the bottom of this trouble. This yarn was sent to a dyer and he returned it in this shape with spots on it. We did not detect the spots until it was too late to ask him about it, but as soon as we found the spots we sent another batch to another dyer and when he returned the yarn it was in the same shape as the first batch sent to the first dyer. We are mailing a sample skein herewith. (5446)

This sample skein appears to have been immersed in the dye bath at too high a temperature, thereby causing the dye to go on unevenly; or the dye solution has been poured into the dye bath in an irregular manner. To the writer, it seems that if the dye bath had been prepared with the necessary amount of dye for the desired shade, together with a sufficient amount of glauber's salt, the bath being cold, or at most not over 100 deg. F., then the well wetted-out yarn entered, turning evenly on the sticks while the temperature was gradually raised to 180 deg. or 190 deg. F., the unevenness would not have occurred. Of course, there might be other causes, but the above seem to be the most probable.

Weaving Elastic Web

We have been trying to produce a woven elastic on our narrow fabric looms, but do not seem to get good results. We are enclosing a sample to show some elastic that we have woven on the above mentioned looms, and would ask you to advise us how we can overcome the trouble we are now having. You can readily see that the product is not right. (5443)

There are several objectionable features to be noted in the sample of web submitted. The unevenness or "bellying" of the goods (a fault which is liable to be aggravated in finishing rather than improved) can be corrected in a great measure by the use of finer edgewires in weaving. If this is not sufficient to remedy the trouble, it may be necessary to introduce another warp thread to the course on each side of the web, making five threads instead of four at these points. These methods have a tendency to fill in and lessen the cavity in which the edge rubbers run, and by so doing these rubber threads will be hugged more snugly by both the warp and filling; therefore will not have the same freedom to contract, so that a flatter web will be the result.

Another objectionable feature noticed is the gut thread pricking through the spaces between the filling picks, making the web rough to the feel, as well as unsightly in appearance. This condition arises mostly through the use of a hard three-ply cabled yarn for the gut thread. It will easily be seen that this thread, operated in unison with, and lying in the same cavity as the rubber thread, being woven in straight when the web is on full stretch, will take on a multiple of kinks when

the rubber contracts upon it, leaving the press rolls. This gut thread being hard and wiry will force itself through the spaces between the filling picks in a very irregular manner. The yarn used in the gut warp should be soft enough to take on the kinks resulting from the contraction of the web without pricking through the goods. A three-ply cabled yarn is not advisable for this purpose at any time. If the web desired necessitates the use of the weight of yarn found in sample submitted, its equivalent should be used in softer stock, or possibly two threads of yarn, which combined will equal the weight required. They will bed better in the gut cavity, without pricking through the goods when contraction takes place.

Many a well constructed elastic web has been spoiled by using unsuitable covering on the press rolls. Sandpaper covering may be all right for non-elastic webs, but should never be employed in the weaving of elastic fabrics, and particularly in web of the lisle class. When the rough press roll releases the web pick by pick, the face of the sandpaper will cling to the goods and create opportunity for the gut threads to prick through as the web contracts. The best results are obtained by covering the main roll with rubber cloth, which should be well glued on the rolls and jointed diagonally in a neat manner. A further improvement could be effected in the sample if gassed mercerized filling were used, instead of ungassed; while plain warps might be used instead of mercerized. The results would be just as satisfactory.

The luster of the goods can be further improved if the ground warp is weighted somewhat heavier and the prominence of the rubber rib be made more pronounced. Finish the goods with a transparent, high grade gelatin size, in order to retain all the luster of mercerization that is possible.

Back Yarns Show on Face of Plaid Back

What means are employed to prevent yarns used for a plaid back from showing through on the face of the goods when finished? (5418)

The means employed to obviate this objection include finer spun yarn for the back than for the face fabric, especially in respect to the yarns which feature most conspicuously. With the finer spun yarn the back fabric is of course thinner and of a lighter weight than the face, whereby the plaiding is less

liable to show through. Another means employed for the same purpose is the use of a shorter and not so good a felting stock for the back yarn. As a result there is less danger of fibres belonging to the back yarn being forced through to the face in wet finishing. A plan studied out with the same object in view is to have the pattern and coloring of the back as harmonious with the face as possible, not having the contrasting shades more strongly defined than necessary. We are assuming that the weave employed by the inquirer does not bring the back yarns to the face.

Open Clock on Circular Machine

Is there any machine or method for making an open clock similar to that which is made on a full-fashioned machine? I would like to make an open clock on a circular machine. Is there any machine or atttachment that will do that? If there is please give me the make of machine. I trust that I have made my meaning quite clear. (5441)

To our knowledge, there is no circular machine for making the lace work made on the full-fashioned machine. The lace work is made by using extra attachments which remove loops from desired needles and place them on adjacent needles after the general style of narrowing. On the next course, this empty needle picks up a stitch but leaves a hole when so doing.

The nearest approach to this open lace work is the tuck stitch lace work made on the circular machine. This really does not give open work, but it does give a pattern somewhat similar. We believe machines for this type of work may be had from any of the usual machine builders.

Finishing Percale

I am enclosing herewith small sample of percale and would appreciate some information, through the Questions and Answers page, as regards finishing cloth the same as sample. I would like to know the finish used most on this class of work; also the machinery required to handle this work. (5424)

After bleaching in the usual manner and dyeing on a 2-roll padding machine, these goods have been dried and put in condition ready for finishing. Finish would be about 60 lbs. of white corn dextrin with eight to ten pounds of some good

grade softener, such as pure soluble tallow or cocoanut oil softener, used on a regular 2-roll starch mangle with wood and brass rolls. The goods have been dried over a cylinder drying machine from the starch mangle and then passed over a 40 ft. tenter, being slightly conditioned to even up the width. They have then been passed over a 5-roll calender with fairly heavy pressure; this calender consisting of three metal rolls and two combination or cotton rolls; metal rolls heated by steam. They should then be ready to put up or fold.

It is unusual to see a finish of this kind on such fabrics except as imitation ginghams. These goods are as a rule dyed in the gray to give the mottled or gingham-like appearance which on ginghams, of course, is accomplished by weaving dyed yarns. The finish on these imitation ginghams is about as above mentioned. Similar fabrics are also used for high-grade supers or interlinings. Instead of a regular 5-roll calender being used, a friction calender is preferred for giving a friction or higher lustre finish. A great many similar fabrics, of course, are printed on a white ground with colored stripes and similar patterns for shirting finishes. In fact, the field for this particular class of fabric is probably greater in the printed industry than it would be in the regular dyed trade.

Drawing and Spinning Worsted

I am sending you a sample of 56s imported top; also a sample of the yarn spun from this top of 1/20s, and used for filling in the sample of cloth enclosed with top and yarn. You will note the uneven slips, or what I call "short," that shows up on the face of the cloth. We are having a lot of trouble with these goods. This yarn is spun, then rewound for the looms on filling bobbins. We are giving this eight operations in the drawing; double end at rover and spin with 9 turns per inch. Will you ask some of your friends to tell us what they would consider a good draft and what they would set the ratches at if they had to make 1/20s from this top. Our drawing is as follows: can gill box, spindle gill box, 1st draw box, 2nd draw box, 3rd draw box, finisher, reducer, rover. It is open drawing. Any information or tips you can give would be appreciated.

(5423)

The sample of top submitted by the inquirer is a good average 56s, of good staple and well combed. There should be no difficulty in spinning a much evener yarn from it than the

yarn sample sent. It is the opinion of the writer that the machinery is not adjusted as well as it might be for producing a good level yarn. Great care should be taken, especially in the last three operations, to see that the end is not dragged too hard, as there is danger of putting in draft between the nip of the front roll and the barrel of the bobbin. This is the cause of more uneven yarn than is generally supposed. The writer would advise drafts and ratches for this particular case as follows:

Operation	Ends up	Ratch	Draft	Wt. of 20 yds. in drams
Can gill box	....	Not too close.	.....	159
Spindle gill box	6	Not too close.	7	136 3/10
Draw box	5	8½	7	97½
Weigh box	4	8	6	65
First finisher	5	7¾	6	54
Second finisher	6	7½	6	54
Reducer	2	7¼	6	18
Rover	1	7	6	3
Spinning	....	.....	6½	.....

On gill boxes see that fallers are clean and pins are in good condition. Nine turns of twist is about right. Care should be taken in the rewinding process that thread guides are kept clean and yarn is not obstructed by waste or fuzz, thereby stretching it.

Cockles in Wool Goods

We are forwarding an end of cloth with a heavy cockle across the piece. We have tried various remedies such as checking take-up and let-off motions and yarns, but this does not seem to help us out of the difficulty. We are at a loss to know what causes this particular defect, and would appreciate your advice as soon as possible. (5434)

Cockles may be due to an irregular "take-up" and "let-off," a variation in the number of picks, or in the size, weight and

twist of the filling, an irregular mixture of the stock, or an insufficient strength of the fulling soap or its irregular application in the fulling process. While it is often difficult to locate the origin of this trouble, it is an easy matter to determine whether the fault is in the finishing or elsewhere, by a careful examination of the cloth as it comes from the washers.

The heavy cockle, as seen in the sample submitted, shows a uniformity all the way across the cloth, with an abrupt change from wide to narrow, equally marked, and distinct in the middle and at the sides of the cloth. The extent of the cockle thus plainly disclosed represents about what might be made by one bobbin of filling.

Cockles resulting from any fault in the soap or its application will always present an irregular variation, and never occur straight across the cloth, as in the sample; usually showing more pronounced in the middle of the cloth and less pronounced at or near the selvages. It is impossible to conceive that any defect of the kind could show in a distinct and uniform line across the cloth, if produced in the fulling.

Cockles caused by a defect in the "take-up" or "let-off" appear equally distinct all the way across the cloth, but the change from wide to narrow is not so abrupt; it appears more gradual, marked by no definite line. In the sample submitted there does not appear to be any variation in the picks; and the filling yarn seems to be reasonably regular.

These conclusions narrow our investigation down to the possible difference between the filling of the wide portion of the cloth and that one bobbin of filling contained in the "heavy cockle across the piece." By removing some of the filling threads from each of these parts, and untwisting them, thus restoring them to the carded condition, we find the mixture is composed mainly of two kinds of stock; one possessing a fairly good felting quality, and a shorter kind quite deficient in this particular. That taken from the narrow or cockled portion of the cloth seems to contain more of the longer fibres, which probably accounts for the difference in the fulling of the two portions.

With this combination of stock, so different in length and fulling quality, it requires but little variation to result in trouble in the finishing. Such a combination needs to be very carefully blended and intelligently handled in the picking, carding and spinning. It goes without saying that the laying

down of the stock for mixing is very important, but the tendency to separation after this is done is often overlooked. The feeds of the cards should be kept well filled, to insure a uniform portion of both long and short fibres being delivered to the machines. It is advisable to keep the top and bottom spools from the finisher card separate, as the rings of the top doffer tend to draw from the cylinder a larger portion of the longer fibres.

The roping from the top and bottom doffers, being spun and delivered to the looms separately, tends to the best results. The keeping of different lots as carded entirely separate in the weaving is also desirable. The writer has had serious trouble with cockles, and by exercising care at every point where a tendency to the trouble appeared, succeeded in overcoming it.

In addition to the suggestions noted, we reduced the size of the picker blow-room, thereby rendering it impossible for the long and short stocks to become so widely separated. One of the most effective precautions adopted, however, was what may be termed as "fleecing" the short stock. This consisted in the short stock being combined with 25% or more of the long stock and run through the picker in the usual way of mixing, and then through a breaker card. This constitutes a mixture that will go along more uniformly with the other stock, both in the blow-room and in the carding; to be mixed in the regular "lay-down" for the picker, so as to secure the percentage of each kind as required.

The difficulty in definitely locating the real cause of cockles renders it wise to take every precaution to avoid them. All the precautions suggested are well worth while.

Dyeing Tussah Silk to Stand Fulling

Would be pleased if you would give me information as regards the dyeing of tussah silk (in the raw stock) so it will stand 2 to 3 hours' fulling. I have dyed the tussah with union colors, and after-treated with chrome and formaldehyde; also dyed it with chrome colors, following the regular top chrome and bottom chrome method. Of the three ways I have tried, the first method is the most satisfactory, but is not wholly so. There are certain shades that I have dyed on wool using the top chrome process. These shades stood fulling very well. The same shades on tussah, dyed with the same colors and by

the same method, did not stand fulling. The tussah is to be used for a striping effect in piece dyes. The pieces are union dyed. (5453)

Tussah silk dyed with direct cotton colors which can be after-treated with chrome, formaldehyde, and acetic acid, should stand two to three hours' fulling. In order to exhaust the dye bath and to have the dyes firmly deposited on the fibre, it is best to add 5% to 10% (depending upon the shade) of acetic acid to the bath after the dyeings have been run for 20 to 30 minutes.

If very bright shades are desired, basic colors, after-treated with tannic acid and tartar emetic, are satisfactory to use, if the fastness to light is not important. For blacks, a developed black gives the finest shade, being faster to fulling against white silk or cotton, and also faster to cross-dyeing.

An expert dyer replies to this question as follows: For violet any top chrome violet treated with formaldehyde and chrome should stand up all right. I advise that your stripe colors be as bright as possible, and when cross dyeing these colors, boil as little as possible.

After treating your tussah silk (raw stock) with chrome and formaldehyde, wash the same off with 1% acetic acid, 140 deg. F., for 15 to 20 minutes. Don't wash after this. If your silk is not thoroughly degummed, use a little monopole oil. Be sure and treat all your diamine colors with chrome and formaldehyde.

Blending Garnetted Silk or Rayon With Wool

Could you give me some information regarding the working of garnetted artificial silk or real silk? Which works the better in a blend with wool, and why? I would also ask you whether the wool emulsion used has any effect on the working of same, and how it acts in carding, spinning and finishing. We are contemplating making some cotton warp bolivias, with a wool filling, blend of wool and garnetted silk, but are at a loss as to how same would work. We also would like to use a small percentage in our top-coating. (5451)

The art of successfully working artificial silk lies in the proper blending with a stock suitable to its nature. As a rule, the artificial silk is too coarse or long for the stock with which it is desired to combine it. This results in a general disrup-

tion of the blend to the extent that it will not card or spin satisfactorily. Artificial silk, being a manufacured fibre, does not possess the submissive nature and good carrying qualities found in the natural silk stock. However, owing to the smoothness of the fibre, it is used in connection with other stock more for decoration and novelty purposes, than for the blending qualities.

Natural silk garnet stock has splendid blending and carrying qualities, when used in connection with other stock. The one bad feature is the liability of using silk which is undesirable for use in goods of high quality. We would not advise the use of a very heavy emulsion in connection with the artificial silk, and it should not come in direct contact with the silk in any case. The wool stock should be oiled separately and run through the mixing picker. Then add the silk to the wool on the second run through.

After the above answer had been printed the following comment was received from a reader: In reference to inquiry No. 5451, printed in the July 4, 1925, issue of TEXTILE WORLD, would state that for several years the products made from artificial silk waste have been used in blends with wool for both woolen and worsted fabrics. The blending of these two kinds of fibres is done in several ways by different mills; also in many cases artificial silk straight is used in the face of pile fabrics, bolivias and other cloths, which yarns are spun either on the Bradford or mule system. When the manufacturer understands the proper way to handle these two fibres, no trouble is encountered in blending them.

E. G. A.

Construction of Epingle

Will you kindly give me some information about the article called "plain epingle." It is a worsted cloth for women's wear. If you will give me the weave and other details of construction (approximate number of threads and counts) for one quality only, it will serve the purpose, and I shall thank you for same. (5455)

"Epingle" is a plain cloth used for women's wear, and is sometimes also called "etamin," although the latter name is not correct. It appears to be an easy cloth to make, but is really one of the hardest to manufacture successfully, great care being necessary in the dressing, weaving and finishing, as

the goods are liable to be streaky. The following is a layout for a 54 in. finished plain epingle:

2400 ends 1/30 regular twist warp.
2400 ends 1/30 reverse twist warp.
60 ends listing.
38 picks 1/24 regular twist filling.
21 x 4 = 58 in. over all.

Dress 2400 x { 1 end 1/30 regular twist. / 1 end 1/30 reverse twist. / Plain 1/1 weave.

Worsted Yarn Kinky

I am enclosing a sample of top and a small sample of yarn. Will you please tell me the cause of the yarn being "pebbly" or "curly?" Drawing ratch is 9¾ in., spinning 9½ in., with a draft of 6 to 8 in the drawing, and a draft of 10 in the spinning. (5452)

A close examination of the yarn shows it to be decidedly "kinky." The particulars given as to drawing and spinning are too meagre to help out very much in defining your trouble and suggesting the remedy. However, we are of the opinion that an average draft of 8 in. in the drawing would be better than 6 in., which is too short for this class of wool in any of the drawing operations. Your ratch of 9¾ in. is all right for the first operations after the gill boxes, but should be gradually reduced to 8 in. in the finishing operations. Let your ratch on the spinning frames be not less than 8¼ in. A trifle longer might be better, so as not to break any of the fibres in the spinning operation. You would also obtain a better yarn and a better spin if you made the roving 20% lighter in weight. The yarn shows evidence of this.

The writer is also inclined to the opinion that excessive twist is being put into the yarn in the single, which may be the cause of some of your trouble when the two threads are being twisted together. We would also suggest that you test your spinning frames for speed. Yarn is more uniform if the spindles are all running at the same R. P. M. If driving belts are unduly slack, there may be a variation of 500 R. P. M. or a loss of speed of say 10%. What the writer has in mind is this: that the twisting together of a thread spun at 5500

R. P. M., and another thread spun at 5000 R. P. M. might cause some of the trouble you are experiencing. There are many factors which enter into a case of this kind, and without knowing the actual conditions under which the yarn is made, we can only generalize as to the actual cause of your trouble.

Finishing Twill Cloth

I am enclosing herewith small sample of dyed twill cloth and would greatly appreciate a formula for starching and finishing same; also particulars of the machinery required. (5311)

The sample appears to show a poor job of mercerizing on a low grade fabric. This is probably what caused the inquirer to ask for information, as it is very seldom that fabrics of this type of finish are mercerized. After bleaching and drying, the goods should be tinted on a 2-roll padder with the coloring material. The writer would suggest using about twenty pounds of thin-boiling corn starch, boiled with the dye liquor, and afterwards cooled down to about 160 deg. F. With this amount of starch it is policy to use twenty to twenty-five pounds of stearic acid softening paste.

Depending on the finished width of the goods, the fabrics should then be dried over a tentering range consisting of 6 cylinders, 90-ft. tenter, heating system, etc., or otherwise they should be dried on a cylinder drying machine and afterwards passed over a 40-ft. tenter to even up the width or bring the goods to the required width. If the finished width is required, however, within one and one-half to one inch of gray width, a long tenter with hot air system should be used. After tentering, goods should be passed over a 3-roll calender with one metal roll and two combination or cotton rolls, running with the metal roll not heated.

Wave or Ripple on Broadcloth

I am enclosing a sample of broadcloth which has a wave or ripple. I am very anxious to duplicate this finish and would be pleased to receive any information you may be able to offer as to the proper method of obtaining this finish. (5458)

This ripple or wave is got by an eccentric attachment on the gig. This should be done before and after dyeing. To get the best possible results, keep the pieces as wet as possible

while gigging. A general routine in this work would be as follows: Tack, full, scour, wet roll at 170 deg., leave on the roll all night, then proceed to nap and gig as regular broadcloth finish, finishing the teasel work on the machine with attachment mentioned before dyeing. Steaming should take place on a regular double steamer with brushing attachment, the cloth being run in the same direction as the brush so as to lay the nap as straight as possible before steaming. Then send to the dye house. After dyeing return to gig with eccentric attachment, running a good half hour to get a good ripple. The old up and down gig has all the attachments required for this work. The cylinder must oscillate while gigging. As there is no further departure from the method on broadcloths, the other processes need not be mentioned. Carbonizing may be done as the finisher desires, either before or after dyeing.

Protective Lining for Kiers

Kindly send me your suggestion as to the best formula that can be used for the preparation of a satisfactory coating for the insides on the kiers such as are used by the bleachery trade. It would be desirable to form such a protective coating, as we are contemplating using softened water in the preparation of our kier liquor and this will eliminate the natural scale that is formed by the lime and magnesium salts and which acts as a protective material to a certain extent. We have tried the ordinary whitewashing method, but this does not seem to have the necessary adhesive qualities, and something is wanted that will stand up for at least a week. Your suggestion on this matter will be greatly valued. (5460)

On account of the high temperatures and the vigorous action of the alkalies used in boiling out, it is difficult to find a satisfactory and durable protective coating for the insides of kiers. One large bleachery using zeolite softened water in the preparation of kier liquors has tried several formulas without much satisfaction. As protection against rust stains is necessary, it was finally decided to line the kiers with cloth. This expedient proved successful; and it has been found that by using unbleached twelve ounce duck, a satisfactory lining is obtained which will withstand several weeks of service before renewing.

Some plants report very good results with the lining

method. With this method we would advise cleaning out the kiers thoroughly at the bottom, lifting up the grate bars and cleaning underneath. If there is any scale, chip it off and then mix up a solution of lime wash of good consistency, about one pound of lime to a gallon of water. Slake the lime first with a little water and allow it time to swell. Then stir in the water until the lime wash is a little thicker than cream. Then give the inside of the kier a thorough coating of this lime wash. If one coat does not leave it white, give it two coats. If the inquirer is using a caustic or soda ash boil he should give the kiers a good lime wash about twice a week. About every three months the bottom of the kier should be taken up and cleaned thoroughly underneath.

Some mills use Portland cement, and have very good results. They make up a very thin mixture of cement and apply it to the kier with a flat paint brush, allowing it to cool gradually at the normal temperature, and it slowly hardens to a stone-like surface. After it dries and is hard it is smoothed off by rubbing sandpaper over the surface. The kiers are coated only when the plant is about to close down, or about once a year.

Fuzzy Silk in Stocking

I am mailing you a 12 thread ladies' seamless stocking in which the silk appears to be quite fuzzy. I should like to know the cause of this, whether from throwsters' defects, knitting needle defects, treatment in finishing, or the condition of the raw silk. Any information you can give me on this would be greatly appreciated. (5464)

Only the most careful examination of every operation in the production of these stockings would enable one to positively determine the exact cause of the fuzzy places. However, we were unable to find any indication of needle or sinker roughness with a microscope. We did find more than half a dozen places where the silk was slightly drawn as if the stockings had been handled by someone who had rough hands, and in our long experience we have often found that the finishers often cause such roughness in handling the goods. If these stockings were knit in the gum, there is very little likelihood that any trouble will be found prior to the boil-off. There seems to be less difficulty with this method.

Regain and Moisture Content

Will you please straighten me out as to the meaning of the term "regain." What is its relation to moisture content? Also tell me what is meant by "conditioned weight." (5461)

Regain is hygroscopic moisture in textiles at any place in the processes. Moisture content is the sum total of moisture in textiles, both free and hygroscopic. Free moisture is never needed in cotton manufacturing except in wet twisting. This is not so with wool. For the sake of reducing static electricity, moisture is desired in the air of a cotton mill. It is therefore necessary to know the regain in the cotton.

Regain is an agreed or fixed or legal per cent of the bone dry weight added to the bone dry weight to give the proper selling weight (or buying weight). Example: A mill sells its product (worsted top) on bone dry weight plus 15%. Example: English custom for worsted tops makes bone dry weight plus 18¼% legal for dry tops and 19% for tops combed in oil. Dry combed top is top combed without oil for use in French twisting. If there is 15% regain in a top, the percentage of moisture is

$$\frac{15 \times 100}{115} = 13.04\% \text{ moisture content.}$$

Total weight (bone dry plus moisture) is called "conditioned weight."

Two-Tone Effect on Rayon and Cotton Fabric

Enclosed please find sample of what is known as a two-tone effect in rayon and cotton fabric. In other words, the silk is darker than the cotton cloth. Will you be good enough to tell us, through your Question and Answer page, how this effect is obtained? (5470)

We suggest that you try the following method, which works well on a practical scale: The dye bath contains 15% of glaubers salt, 2% of Marseilles soap, and ½% of soda, the fabric being entered at 30 to 40 deg. C. After treating for some time (one-half hour) at this temperature, add 10% more of glaubers salt and raise the temperature slowly to 85 to 95 deg. C. With this additional amount of glaubers salt and higher temperatures, the rayon will take up more dye than the

cotton. It is advisable to take samples quite often, so as to watch the shade of both cotton and rayon. A lowering of the temperature will allow the color to go on the cotton and not on the rayon.

Sizes of Cotton Yarn for Stockings

Will you be good enough to advise me which numbers of cotton should be used, or which would give the best result, for the ribbed top, heel and toe of a man's stocking, body of 10 thread silk, using a 240 needle (spring) 3¼ in. cylinder machine? Also please give similar advice as to the best combination for a woman's stocking with transferred top, using 10 thread silk, with spring needle machines, 260 needles and 3½ in. cylinder. The manufacturers here wish to turn out a high grade stocking with good wearing qualities. (5479)

We recommend 40/2 mercerized for the half hose ribs and 50/2 mercerized for the heels and toes, and would reinforce with 80/1 mercerized. The ribs should have 240 stitches. For the hose we would use 50/2 mercerized for the tops, heels and toes, with 80/1 mercerized splicing. If the tops for these stockings have many stitches to be doubled in transferring, it would doubtless be necessary to use a finer yarn in the ribs in order to have them of the proper size when finished. The grades of yarns used would be determined by the selling price of the stockings.

Bleaching and Glossing Wool Yarn

We are trying to bleach an all-wool yarn so that it can be used in white sweaters. Is there anything that will put a gloss on woolen yarn after it is colored so it will compare more with the worsted yarn? Any information that you may give me on this subject will be greatly appreciated. (5467)

The bleaching of woolen yarns is carried out almost exclusively by the so-called double bleach, that is, a peroxide bleach bottom followed by a topped sulphur bleach. This gives the best possible bleach obtainable on woolens or worsteds. On the other hand, some firms give the woolen yarn a single bleach using either the peroxide method or the sulphur method. The former gives a permanent white, whereas the latter gives but a temporary bleach which will go back to the original color on ageing or washing. The peroxide bleach is more costly and

requires more care, but less labor; while the sulphur bleach requires a considerable space in a specially built air-tight chamber for hanging the skeins over night while subjecting them to the fumes of burning sulphur.

In either case, the yarns must be well scoured, using a good grade of olive oil soap (preferably a potash soap) soda ash and a small quantity of ammonia. In scouring, the temperature should not exceed 125 deg. F. The material is then well rinsed and hydro-extracted, after which it is ready for the bleaching process. If you will advise us as to just what method of bleaching you are desirous of using, we shall be delighted to inform you in detail as to equipment and recipes.

Relative to putting a gloss on woolen yarns so that they will compare more favorably with worsted yarns, I would advise the use of super olive emulsion, using from one to three per cent, depending on the grade of yarn you are handling.

Poor Dye Penetration on Resist Dyed Silk Hosiery

We have in our line of hosiery a number made of artificial silk plaited on tram silk, with a mercerized heel, toe and top, and resist dyed silk in the body. In order not to kill the color of resist dyed silk, our dyer must stay below 180 deg. while dyeing. He does not have any trouble with the gray, navy, cordovan or black, but when he comes to light beige, he cannot get the penetration in the heel and toe, and they are very much white spotted when they come out of the dye tub. We have this same number in the line without the resist dyed silk and he dyes them very nicely in the same beige color, so that it shows the trouble is due to the fact that he must stay below 180 deg. Kindly advise us just what we could do on this sock in order to insure better penetration, so that the heels and toes will dye through. We thank you in advance for giving this question your prompt attention. (5478)

Mode shades on silk hosiery usually require boiling to obtain the proper penetration, due, probably, to the kind of dyes used. If the inquirer is resisting his own silk, we would suggest his trying the following formula for resisting which will stand boiling: Prepare a bath of 20% tannic acid, figured on the weight of the silk. Add enough acetic acid to clear the solution (½ pt. to 100 gals.). Enter the thoroughly wet out silk at 140 deg. F. and work 10 minutes. Raise the temperature to 180 deg. F. and work in the cooling bath 45 minutes.

Without rinsing, enter into the tartar emetic bath (containing 25% of the amount of tannic acid used) at 160 deg. F. and work 15 minutes. Without rinsing, enter in a bath of tin crystals. (This should be 25% of the amount of tartar emetic used. Enough muriatic acid should be added to clear this solution—about ½ pt. to 300 gals.) Run cold for 15 minutes, lift and rinse well, finishing with a light, cold soaping. Starting the dyeing bath at a low temperature and running for 10 minutes before applying heat should help. Also add the glaubers salt or common salt in small quantities.

Peroxide Bleach on Rayon and Wool Hose

Would you be kind enough to give me a formula for bleaching artificial silk and wool plaited hose and hydrogen peroxide (in solution) and oblige? (5463)

First, the hosiery must be scoured, using 5% pure (neutral) olive oil soap and 2% silicate of soda. Give it one hour at 130 deg. F. Rinse thoroughly with warm water two or three times and hydro-extract. Then enter into the bleach bath prepared as follows: To every 100 gallons of water, add first 3 gals. albone 25 volumes per cent hydrogen peroxide. If using any other hydrogen peroxide, base the amount on the strength. For instance, if 100 volumes per cent, use ¾ gal.; if 12 volumes per cent, use 6 gals., etc. Then add ¼ lb. of tri-sodium phosphate and 3 lbs. silicate of soda. Stir well and bleach at 130 deg. F. from three to five hours, or until desired shade is obtained. Tinting is conducive to a better color. After bleaching, rinse two times with warm water and once with cold water. Do not process this class of goods in a rotary machine, as the wool will felt and give a bad appearance.

Starching and Tinting in One Operation

Kindly advise if tinting, such as is represented by the enclosed samples, can be done in a 2-roll starch mangle. Also kindly state whether the dye can be mixed with the starch so that the tinting and starching can be done in one operation. (5823)

We see no reason why the shades as shown by the samples could not be starched and tinted at the same time, provided the goods are thoroughly bleached to give the dye liquor a good clean basis to work upon. We would be inclined to recommend, instead of the regular 2-roll starch mangle, a heavy

2-roll padder with a small liquor box. The starching should be done with corn starch of the highest possible viscosity to keep the starch liquor as thin as possible. It would be necessary, of course, to use a softener with the starch mixture, and the writer would suggest as a softener when using dyestuff with the starch nothing other than a fine grade of 50% Turkey Red oil.

The padder should be built with two rubber-covered rolls, not less than 14 in. in diameter, bottom roll covered with about ½ to ⅝ in. thick hard rubber, top roll with ¾ to 1 in. thick medium density rubber. The rubber covering on these rolls preferably should be natural or near-white color. We would suggest running the padder separately and not with the tentering range, so that the speed at all times will be the same. Many concerns are running padders on this class of work at 125 to 150 yds. per min. without any trouble.

Yarns of Different Quality from Similar Tops

I submit two samples of 2/48s yarn, 64 quality, with the same 2-ply twist for your inspection. No. 1 is a sample of yarn sent from the weaver for us to match. No. 2 is the yarn we have spun. The greatest care has been taken with the spinning of our yarn, but in spite of that fact, it is not nearly as strong as No. 1. The customer insists on it having a certain breaking strength with a certain number of turns in the 2-ply (14 actual). One yarn is 5 lbs. under the breaking strength required in spite of the fact that we have 19 turns in single. We have tried more without improvement. The tops from which we spun the yarn showed a regain of 18.5 and 5.4% oil. Would the above fact cause the yarn to be weak? I can hardly think that that is the cause of it, as previous tops we have spun have been just as weak, though the condition of the tops was all right. I cannot help but think that the submitted yarn is spun from better stock. Can you form any opinion from the sample? I also enclose sample of the top from which our yarn was spun to help you in your deduction. (5500)

We are of the opinion that both samples of yarn submitted are from the same quality of top, which is a good 64s, varying in length of staple from 2½ to 4¾ in.; the mean being approximately 3½ in. With skillful handling in the drawing, this should produce a better 2/48s yarn than the sample submitted. The spinner of sample No. 1 has been more successful in his effort to produce a level yarn than has the spinner of sample No. 2, as the fibres are far more evenly paralleled

or distributed alongside each other. This results in a yarn of higher breaking strength. The lack of this even distribution seems to be the only reason for the weakness in sample No. 2, indicating a lower quality of manufacture.

It is assumed by the writer that it is made by the Bradford system. The inquirer says that "the greatest care has been taken with the spinning of our yarn, but in spite of that fact it is not nearly as strong as No. 1." This statement may be quite correct; but, even so, unless the machinery is arranged suitably with regard to ratches, drafts and doublings to successfully deal with this class of wool, all other efforts may still be futile. A twist of 16 turns per inch ought to be sufficient in the single, and 14 turns actual in the double is about right. Too much twist in the single makes the yarn more tender and brittle, and also gives it a harder "feel," which probably gives you the impression that your own stock is a little lower than that used in sample No. 1, when such is not the case. If you care to send to this department full details as to how this yarn is run through the drawing, it may be possible to make some suggestions regarding the same.

Employes Per Spindle and Per Loom

Can you tell me what is the average number of employes in a cotton mill per 100 spindles and per loom? (5471)

The number would vary, of course, according to the class of work, but for rough figuring we estimate one employe per 100 spinning spindles and one employe for every two looms, if a weaving mill. That does not mean that one employe operates two looms, of course, but it means that in the whole weaving mill it figures out that way, for a rough average. This does not include office force or common labor.

Scouring Rayon Knit Fabric

We wonder whether there is a more efficient method of scouring artificial silk fabric than that which we are using at the present time. The fabric is knitted on fine-cut circular underwear machines, and unless the artificial silk yarn is wound in oil, it will not knit satisfactorily. We scour the fabric in hot water with a very good soap, but it takes very long scouring and many rinses before the oil is all out of the fabric. (5480)

We suggest the method given below which is working out

very satisfactorily on a practical scale, with the rayon left in a clean and soft condition ready for bleaching, dyeing or drying, as the case may be. Make up a stock soap liquor with 100 lbs. of a good white chip soap, to which add 25 lbs. of trisodium-phosphate and 10 lbs. of 58% sodium carbonate, the whole made up to 100 gals. with water. Be sure all chemicals and soap are dissolved. If you have not this capacity tank, make up in a smaller or larger tank, keeping same ratio between the chemicals, soap and water given. Ordinarily one pailful of this soap liquor to 100 lbs. of rayon will be sufficient to give a good clean scour; but if this does not clean well, add more soap. In scouring, there should be a good thick soap lather all the time. Scour for one-half hour in hot water. Then give two good hot water washes of from 20 to 30 minutes. Finish with one cold wash, running goods until they are cold.

Labor in a Woolen Card Room

I would appreciate the answers to the following questions through your Questions and Answers columns: What would be the operating force of a card room of 16 sets cards (woolen system) with 10 sets on one floor and 6 sets on another floor? What is classified as productive and non-productive labor in a card room? What is the percentage of non-productive labor to productive labor usually found in card rooms of 16 sets, based on day work only—not in man power, but on a payroll percentage. (5466)

The operating force of a card room, when divided into two departments, is usually larger than when it is all in one room. However, it seems that the following line-up should be sufficient help for a 16 set room: 1 overseer, 1 second hand, 2 finisher tenders on the 10 sets, 2 Apperly feed and hopper tenders on the 10 sets (5 sets each). Two men run 3 finishers and 3 Apperly feeds each. In the 6 set room, 1 man looks after 6 hoppers. Four card strippers are sufficient for 10 sets. There should be a man to look after stock and waste.

All help that are not directly engaged in the operation of the machinery (that is, in the producing capacity) are termed non-productive help. This would include the overseer, second hand, stripper and stock men. All of the other help would be directly connected with the actual production of the machines and would be classified as productive help. The percentage of

non-productive labor in a 16 set card room should range around 60% of the payroll percentage. Of course this figure is subject to variation.

Wool Oil for Cotton and Wool Fabric

Will you advise us regarding wool oil emulsions which would work to good advantage in a fabric containing 25% cotton and 75% wool? We are at present using a wool oil which contains 85% of mineral and it is difficult to get the goods clean. We are also having trouble in our washing department on account of the blue bleeding in the fabric we are now making. The bleeding in the washers does not seem to stop regardless of how long we wash the goods, and at the same time does not seem to show much of a variation in shade after being finished. The colors we are using we have tested to light and fulling in our laboratory and we find they are extremely fast, but when we take the finished piece which contains exactly the same colors they fade within a very short time. Would it be possible that the mineral oil emulsion we are using would affect the dyestuffs? If not, what do you think is giving us this trouble? (5497)

The first question to be raised is as to whether you are using straight cotton or cotton waste, oily card, soiled card or cotton strips. These materials would have unquestionably more or less mineral oil in the fibres, and to remove this would not be a very easy proposition. Assuming that you are using straight cotton with your wool, any good wool oil ought to meet your case, although we think that you would get better results if your oil were richer in its saponifiable matter; that is to say, if instead of containing 15%, it contained 30%. You might take it up with the concern supplying you with wool oil and state that you would like a combination containing a larger percentage of saponifiable matter. Even when mineral oil is the larger constituent in a wool fibre there is no particular reason for its not coming out of the material with ease. Emulsification assists in reducing the particles of the mineral and the saponifiable oil to their smallest dimensions, and, after lubrication is completed, they wash off.

We might suggest that you look into the character of the water that you are using. If it is a hard water containing lime and other salts, you will always have some difficulty in washing a fabric perfectly clean of fatty matters. You might find it of advantage to use a little ammonia in the final washing water.

As to the bleeding of your fabrics in the washer, we assume that you refer to the fabric containing cotton and wool. It is always a difficult matter to obtain dyestuffs that will give satisfactory results on both fibres or a mixture of these fibres, as the color you are using may have a stronger affinity for wool and a much less affinity for cotton. In this case the color might be quite fast on the wool fibre and less fast in the cotton, and so lead to a continuous bleeding in the washing. Not knowing the dyestuffs you are using or the method of mordanting adopted, we cannot further advise you. You had better take up the matter with the concern supplying you with the dyestuffs.

Your laboratory experiments and your mill practice ought certainly to yield similar results. Mineral oil in any event is positively neutral to dyestuffs, though it might interfere with proper mordanting. Why not make a test in your laboratory —one swatch postively free of fatty matter and the other imperfectly washed and so containing some of the fatty matter of the oil you are using.

Manufacturing Chenille Yarn

We are enclosing herewith a small sample of chenille yarn and would appreciate it very much if you would give us a process of manufacturing yarns of this type. (5493)

This material is woven on weft looms which are ordinary built 85 inches between swords, 4 harnesses, 1 x 1 box. The sample submitted shows that the warp for each strip of chenille is drawn in four ends at a time. The warp is reeded so as to allow certain spaces between each set of four ends. After the material is woven, it is passed through a cutting machine which cuts the filling between each set of warp threads, thus making the strips of chenille.

Elastic Braid Curled and Uneven

We are enclosing samples of elastic braids which are made with 30/2 cotton, and rubber thread No. 34. Will you please tell us the cause of their being curled? We use tension weights for every gut, as we found it better to control its tensions. We have also tried more tension on the edge threads. What can we do to make them plain or regular? (5496)

The cause of the unevenness and general poor appearance of the sample of elastic braid submitted lies largely in the failure

to maintain regularity in the tension of the individual strands of rubber threads which enter into the goods while in the process of braiding. In dissecting the black sample submitted, it was found that the length of thread varied from 2 to 3⅜ in., a difference of about 60% between the two extremes.

From the wording of the inquiry and reference to the use of tension on each gut (which we presume in this case means the individual rubber threads employed) and of your applying special tension to the edge threads, it would appear that each particular rubber thread has been braided in the fabric under separate control, a method which does not appear to be practical for maintaining uniformity of tension in the delivery of each thread. This is not the plan generally employed in manufacturing such goods. There is perhaps no elastic fabric made which is more sensitive to the irregularity of the individual strands of rubber than braids, inasmuch as it is impracticable by the employment of such a method to assist the balance of the web in any way. The same is not true in weaving, where cotton gut threads may be introduced or the front reed manipulated, and a variety of other methods used to assist in this particular.

For this reason, it becomes necessary to take measures to maintain absolute uniformity in the delivery of the rubber threads used. This can best be accomplished by grouping them together in warps and delivering them into the braided fabric all under the same general tension. A grooved headed beam is used for this purpose, which allows for variable weight regulation and makes it possible to obtain the most economical results in thus controlling the warp, and to get the very highest possible tension.

In making such warps, it is advisable to use as long a floor space as possible when opening up the sheets for splitting into sections for the purpose of putting the same on beams. This will correct any irregularities of the different threads which may have been produced in chaining, and will distribute any such irregularities over a longer length. Thus they will be returned to their original uniformity. These rubber threads act, of course, like a series of springs, and they must operate in perfect unison all across the goods, if a flat, marketable fabric is to be produced. A well-made warp can be weighted up to

the highest possible point of tension, and thus the most economical results are attainable.

Upon dissection of the sample, there was also noticed a marked difference in the size of the rubber threads used. In the inquiry, it was stated that the size of the rubber thread used was 34s, but there was a difference in the size of some of the threads varying from 32s to 36s. This thread was evidently taken from a poorly cut sheet, which should have been classed as second and was only fit to be used in group form in such goods as rubber cords. A mixture of sizes may have taken place in the assembling of the threads for individual feed into the machine. This variation in size alone is sufficient to produce in a great measure the undesirable features complained of. The same relative variableness will appear in the goods as in the thread sizes, so that curling and cockling will take place.

Let-Off Motion Allows Silk Warp to Slip

On our plain silk goods, especially crepe back satins, we are having trouble with streaks and waves running across the width of the goods, caused by the letting-off motion allowing the warp to slip now and then. We have tried French chalk and graphite, which improved the defect to a slight degree. What would you advise our doing? (5486)

We would recommend that the flanges be painted with stove polish, this having a tendency to give better rope slippage. The pressure roll should be covered with felt. The balance weight should be heavy enough to prevent any rocking of the warp beams. Manila hemp rope would be more suitable for weights than cotton, as this does not have a tendency to stick.

Objectionable Nap on Flannel Suiting

We enclose herewith samples of suitings that we are running on, and attached to same is the formula of the way we have finished them with the addition of a good press. We are also enclosing sample of the same material after it has been sponged by the spongers. You will note that the sponging has raised the nap on this sample, making it objectionable to the suiting trade. Is there anything you can recommend to us for the finishing of these goods that will prevent the nap from raising during sponging and that will give them a glossy appearance? Any information you can give us will be greatly appreciated.

Sample Suiting: 11 oz. This piece of flannel came off the looms weighing 10 9/10 ozs. per yard. We fulled same 5½ in. per yd., using a palm oil fulling soap 8 ozs. to the gallon of water. The process of fulling took about one hour and fifteen minutes. In scouring we used a solution of 8 ozs. of soap and 2 ozs. of soda ash per gal. of water. The process of scouring and rinsing took about two and one-half hours. This piece of flannel pulled out one and one-half inches per yard in scouring. We based our figures at 16%, including all losses and head shrinkage. (5501)

The quality of the stock is rather too coarse and deficient in felting capacity to insure the best results as to the smooth and permanent finish desired, it being better suited to a cheviot finish. But as it is, there may be an opportunity for improvement.

In the formula for finishing given, we note that 8 ozs. of palm oil fulling soap to the gallon of water is used for fulling, and 8 ozs. of soap and 2 ozs. of soda ash per gallon of water for the scouring solution. There is nothing said about soda ash or any other alkali being used in the fulling soap. This may be an oversight; but, if not, and the fulling soap is prepared without any soda ash, the method is all wrong.

There should be sufficient alkaline strength in the fulling solution to saponify all the grease contained in the goods, which would require at least 3½ ozs. per gallon. This, in connection with the 8 ozs. of soap, should give good results; and the same soap, or that at present used, should answer for scouring. With the strength of the fulling soap properly adjusted, all the impurities in the goods should be taken up, so that 30 minutes with a good lather, followed by 45 minutes for rinsing, should thoroughly cleanse the goods. If it really requires two and one-half hours for scouring and rinsing, there must be some lack in the fulling.

Upon holding the sample against a strong light, there is noticeable a mottled or spotted effect produced by an uneven felting of the cloth. This may be due to a lack in the felting quality of the stock, or to the lack of suitable strength of the fulling soap. The finisher should be able to determine this.

The "spongy" or "fuzzy" condition of the cloth, due to the kind of stock used, may be the chief trouble. To overcome this we would advise the use of a "wool finish." This is a preparation that may be applied to the goods just before they

are taken from the washers. It adds very materially to the handle of the fabric and to the permanency of the finish and pressure effect.

In addition to this, be sure the shear brushes are doing good service, and shear the cloth as closely as is allowable on the face. Give one or two runs on the back to remove all the fibres that are likely to rise up in the sponging. Give a hard pressure with a light steam as the cloth enters the machine, and allow it to cool in the roll.

Streaks in Mercerized Hose After Dyeing

I am enclosing one stocking which shows streaks and unevenness in the mercerized top and would ask you to kindly advise me if you think the fault is in the yarn or the dyeing. (5505)

The fault is in the yarn and not in the dyeing. The trouble is unevenly mercerized cotton, and is very difficult to overcome in the dyeing, particularly in shades like the sample. Scour out the hosiery well before dyeing, and boil a little longer in the dyebath. Using properly mercerized yarn in the knitting is the only sure way of overcoming this trouble.

Take-Up in Cable Cord

The writer would like to know the correct definition of the phrase "take-up" in cabled cord fabric. As you no doubt know, on the third ply twist of the cord you have a minus "take-up," and on the second twist you have a plus "take-up." Does this have any influence on the strength and elongation of the cord and what relation is it to the twist? The following is an analysis made on 23/4/3 carded peeler yarn: The third twist 9.4 turns per inch, with a minus .05 per inch "take-up" or a one-half inch on 10 in. of cord. The second twist, 20 turns per inch and a plus .25 "take-up" on 1 in. On a single yarn a twist of 20 turns per inch. This analysis was made on a twist counter. If you could enlighten the writer on the same, it would be very much appreciated. (5562)

We do not know whether the expression "take-up" when used in connection with cord tire fabric refers to the ordinary take-up in weaving or to the take-up or contraction in the cord itself, due primarily to the twists. We have never run across this term. In this connection the weaving take-up would

be very slight, amounting perhaps to only 2% or 3%, due to the very few picks.

The inquirer notes the length changes which occur when a normally twisted cord is untwisted in a twist counter. The figures he gives are approximately correct, although of course they vary somewhat, depending upon the twists and other factors. We usually use the term "contraction," by which is meant the contraction of the single yarns due to the twisting, which will run around 20% as calculated from the relation between the original 10 in. length of cord untwisted, and the straight length of the single yarn after removal of all twist. In this case the percentage contraction is based on the straight length.

We are sending a chart which shows graphically what happens when a piece of cord is untwisted, and in this case the turns of twist are based on a 10 in. length of cord and are thus divisible by 10 for twist per inch. Perhaps also the article, "Twist in Tire Cord and Some Physical Effects," printed in the July 11, 1925, issue of TEXTILE WORLD, may be of further interest to the inquirer. The twist combination has perhaps the greatest single influence on the contraction relations; and the twists, contractions, strength, elongation and elasticity are all very intimately related together with the cotton itself, in cord construction. Considerably more than is now known has yet to be learned on this general subject.

Boil-Off for Hosiery

Will you kindly send us instructions on how to boil-off hosiery for a pin test which we wish to get each day from our machines. We wish to see the goods after they have been degummed. The quantity will be from ten to twenty stockings and we wish to know the quantity and temperature of the water as well as the amount and kind of soap to use. We might add that we are using hard water. (5506)

Use a bath of about 30 to 40 gals. capacity. Dissolve 20% (of the weight of the goods) of green olive oil soap and enter the hosiery. Keep at the boil for one-half hour, taking care that the direct steam does not strike the goods. Also keep the hosiery circulating and free from tangles. Wash well in warm water. The amount of soap specified may be varied according to the degree of hardness of the water, and it may result in

soap spots on the hosiery, but the above formula will answer your needs. We suggest you get a sample hosiery dyeing machine, which is excellent for your purpose.

"Shiners" in Rayon Filled Cloth

We are using considerable rayon in 150 denier. While rayon is not a new thing for us to use in fancy styles, on dobby weaves we have no trouble owing to the fact that the pattern usually breaks up any defects that there may be, but when we weave a plain cloth such as 64/60, or twills, we have trouble with "shiners." I am enclosing you a swatch which is ticketed, construction 38 in. 72/72, and in this particular piece of cloth the "shiners" are exaggerated. These were made intentionally in most cases. The other swatch, which we have had dyed here at the mill, shows the "shiners" after finishing, same as in the gray.

We have been experimenting with this, and have tried various methods. We have oiled our silk, which appears to help to some degree, and we have also sized our filling, but it appears, so far as we have gone, that whatever precaution we may take, we still have some of these defects. We are still working on this and trying various methods to overcome the same, such as using care in the weaving and winding processes, but as yet it seems to be almost impossible for us to weave one cut of cloth without several of these defects, which in some cases are quite pronounced. Any assistance that you could give us in this matter will surely be appreciated. (5534)

Taking up the gray plain woven sample, the picks that are shiners on this sample have not been woven tight. They have been pulled tight by human agency in order to try and pass the buck to the weaver. It is not the shuttle that has pulled them tight because in most every case the filling is broken at the selvage and you will note a double pick on the selvage side of the cloth, showing that the pick is broken for one-quarter inch from the body of the cloth. There is only one thing, other than human agency, that could bring about this condition and it is as follows: If the cams are set to close very early, and a knot is holding the filling back, the shed would close on the filling before the shuttle reached the end of the opposite box. But it is really out of reason to say that the filling would break at this exact spot every time that the filling was held back by a knot on the tube. A large knot is about

the only thing that could cause the filling to hold back, considering that the rest of the cloth is woven without shiners.

Take the gray woven sateen sample as another example. You will note that where the uneven shaded filling is woven in the cloth there is no such condition on the selvage side of the cloth. The picks that are uneven shaded are woven in very loosely and the selvage, where the uneven shading is the worst, is very straight, showing that the picks are woven in loosely and the picks show in the cloth as woven loose. I have pulled a few picks tight to show the difference between a real tight pick and an uneven shaded pick.

The yellow sample is a glaring example of uneven shaded filling. You will note that the uneven shaded places appear in streaks which do not extend across the cloth. Is it not reasonable to expect a pick that is weaving tight to show a tight place from selvage to selvage? The selvages on the yellow sample are very light and a filling of the size of 150 denier, and pulling tight from a shuttle, would certainly pull very hard on a light selvage. These selvages show that no pull has been imposed on them; they are splendidly woven and are very even and straight.

The condition of the selvages on the yellow sample show that very little friction has been used in the shuttle that wove this cloth, and the manner in which the streaks appear in the cloth prove that the fault lies with the filling.

As a further test to practical weavers I would advise the following as a setting of the loom to disprove the idea of too much friction in the shuttle. The setting I am about to advise is not practical for weaves where the sley or pick is heavy, but all practical weavers will see what the writer is trying to prove.

Set the cams or dobby crank for a very late closing of the sheds. This means that the shuttle will reach the end of the opposite shuttle box before the shed closes on the pick of filling. During the passage of the shuttle across the loom, the filling has been unwinding very rapidly. When the shuttle reaches the end of the shuttle box, on the opposite side from which it started, it will rebound slightly. Most all shuttles do this, and this rebound will let the filling lie loose in the still open shed. In this manner the shed will close on a loose pick of filling. This setting will be rather hard on the selvages and if the pick and sley are medium heavy the cloth is liable

to bump back some, because the sheds will commence to open and draw the fell of the cloth towards the reed, and as this is the time that the reed is approaching the fell of the cloth at its greatest speed, it is much like a collision between two objects that are moving towards each other.

The writer would advise mills to try this as a remedy. When cams or dobby are set to open the sheds early, this opening movement is completed before the reed reaches the fell of the cloth, and the moving reed strikes the fell of the cloth when the fell of the cloth is stationary and there is no bumping back of the cloth.

Rayon and Silk Fabric Cockled

I am enclosing a piece of rayon filled 2 and 2 twill, natural silk warp, that shows very bad cockles. These bars of cockles run an inch or two wide in some places and have run for as much as one-half yard. The goods are ⅛ in. narrower where the cockles are in 24 in. wide goods, and ¼ in. narrower where the goods are made 48 in. wide. The rayon is viscose 150 denier "A" quality. The cockles cannot be taken out in finishing. We would very much appreciate any information as to the cause and remedy for this defect. (5509)

There is evidently too much tension on the filling, and if you will advise us how you are getting the tension, we may be able to suggest a different method. Not being familiar with the way these goods are being made at present, we can only advance some suggestions that can be tried. We have found that during the quilling process, if a pad is put on the quilling frame, this to be soaked with stainless oil, and the rayon thread run over the pad as it passes to the quill, the matter will be helped considerably—especially if the silk is lively, which no doubt is one cause of the trouble.

Dyed Stock Bleeds Into White

I am enclosing a piece of cloth just as it comes from the loom. The brown yarn in this cloth will not stand warm water or soap. It will bleed into the white. I have used salt and reduced my soap with water down to neutral and still it bleeds. Could you give me any information that would remedy it, or keep the white in its white condition. (5549)

By several tests made in scouring the sample submitted, we are of the opinion that it will be difficult to finish the goods and retain a perfectly clear white unless there be some favorable change in the dyeing of the brown stock. As regards the brown not standing "warm water or soap," no water should be used on the cloth previous to soaping, nor should a reduced soap be used other than to avoid an excess of alkali. Whatever soap is used, it should be a heavy bodied solution that will hold the loose and floating color to avoid its being ground into the white in the fulling process.

The character of the white stock is such that it will take the stain very readily, and if the brown stock was greasy when dyed, the tendency to bleed would thereby be increased. We would advise the following procedure as likely to give the best possible results:

Scour the goods thoroughly before fulling, using a heavy bodied soap and avoiding an excessive alkaline strength. Run 20 minutes in the first soaping, then rinse off with warm water (not hot) until the water runs clear. Then close the washer gates and apply sufficient soap to create a good lather. Run 10 minutes and rinse thoroughly with cold water. Extract as thoroughly as possible and pass promptly to the fulling mills, using heavy soap, thoroughly cool, and avoid overheating in the process.

When fulled, give a final washing, using only sufficient warm water to create a good lather for 15 or 20 minutes; then rinse well with cold water only. Extract and dry promptly. Most of the staining probably takes place in the fulling. The idea is to get rid of all the foreign matter and loose dye before the fulling and to handle quickly. If this fails to give good results, look to the dyeing.

Setting Shed for Warp-Face Sateens

How far should the reed be set from the fell of the cloth when harnesses are level for best results on weaving 140 sley warp-face sateens made from 50s warp? (5526)

The distance the reed should be set from the fell of the cloth will depend on the type of cam used. If the cams are of the quick opening type with a long dwell, it is well to set the reed about one and one-half or one inch from the fell of the cloth when any two of the cams are changing or when any

two of the harnesses that are changing come together level with each other. If the cloth is being woven on a dobby which is of the rolling type, or on a cam with a short dwell, it is good practice to set the reed back as far as possible, when any two harnesses have come to a level previous to changing. The reason for the first setting with the quick change cams is that the yarn, which on this type of cloth is heavily reeded, is easily separated with the motion of this type of cam, and the pick of filling is inserted much easier with this close setting of the reed. Such a setting is much easier on the warp yarn, because the filling does not have to be pushed into the fell of the cloth on a closed shed, thus preventing the size of the yarn being disturbed.

When using the dobby or the cams with a slow opening, the yarn being heavily reeded, is slow in separating, and some of the warp ends are liable to stick together and remain stuck together for about one inch from the fell of the cloth when the shuttle passes through the shed. When the pick of filling is being pushed up to the fell of the cloth, it will come in contact with these threads that are not fully a part. This causes both warp and filling kinks, which is one of the greatest troubles in the weaving of cloth of this description. The filling is often cut by the impact with the partially opened threads and this causes a warp float. Hence the reason why the shed should be set to open as early as possible when using the slow opening cam or the dobby for the weaving of heavy warp sateens. The quick opening cam is much harder on the yarn than is the slow opening cam.

Weighting of Silk Crepe

I am writing to inquire if you have any information available relative to the formulas, methods and equipment (including detailed method of handling) used in the weighting of crepes, both silk and silk and rayon. (5511)

A detailed account of the weighing of silk piece goods was given in an article by H. R. Tisdale in the TEXTILE WORLD of June 28, 1924. The main point of difference to be noted is the fact that crepe silk has about 35 turns per inch and the weighting of this class of silk should not be carried too far. If we consider that the silk is boiled off from 16 oz. to 12 oz., we should only figure to add about 50% additional weight, that is,

about 18/20 oz. return weight. A heavier weight than this will be apt to change the character of the silk. On account of the tight twist of the silk thread in crepe cloth, one must be very careful to wash the silk pieces very thoroughly after each operation of the weighting process.

Cotton Pilled in Drying or Carding

Please have your department tell us what has happened to the fibre in the black sample enclosed as compared with the gray? (5519)

There is present in the black stock a percentage of cotton which has "pilled" during the drying or carding processes. The latter seems likely to be the cause of the fault, through the fancy not having been adjusted properly to raise the stock from the cylinder. The gray stock is of good quality and does not contain any foreign matter.

Bleaching Tubular Knitted Underwear

We beg to advise that we are bleaching tubular knitted underwear with chloride of lime and find that we are not getting a good white. It has a cream cast. Please advise how we can overcome this. We are enclosing sample of our bleach. (5558)

The failure to obtain a good white may be due to one or more of several causes. Bleaching processes differ in details in almost every plant and since you have given us no details of your process, we will outline a method by which you can obtain a good clear white on the finished cloth, and from this you will probably be able to find out just where your trouble lies.

It is very essential that the goods be given a thorough boiling-out to remove the natural impurities contained in the cotton. Unless a good bottom is obtained on the cloth no amount of bleaching will give the desired result. The best and cheapest way is to give the goods a boil in a pressure kier. On lightweight goods, such as the sample submitted, we would recommend a boil of about 8 hours duration with approximately 2% caustic soda, 1½% silicate of soda, and 1% soda ash, all percentages on the weight of the goods. These quantities may be increased or diminished as experience shows best.

If, instead of kier boiling, a string washer is used, a boil of about 4 hours with 2% caustic soda and 1% to 2% soda ash will usually be sufficient. But it should be remembered that boiling in an open washer will by no means give as good a bottom on the cloth as that obtained by a kier boil.

After boiling-out, the goods should be washed practically free of alkali and then given a scour with muriatic acid at a strength of about ½ deg. Tw., remaining in the acid for one-half hour. This acid treatment aids materially in obtaining a good bleach.

The cloth is then washed free of acid and run into the chloride of lime solution. The strength of this should be from 2 to 3 grams of available chlorine per liter, as the water mechanically held by the cloth will weaken it considerably. When the goods are thoroughly saturated with the bleaching liquor, they should remain exposed to the air for from 1 to 2 hours —longer in the case of heavy-weight cloth— in order for the reaction to be complete. This air bleach gives a clearer and better white than is obtained by running continuously in the bleach liquor.

The next step is to wash out the greater part of the chloride of lime and then neutralize what remains in the cloth with an antichlor. The compound most generally in use for this is bisulphite of soda. The excess bisulphite is then washed from the cloth. A test should always be made to make sure that all the chlorine has been removed from the goods, as even a small amount dried in the cloth may cause harshness and tendering. The test solution is made by boiling 4 oz. of laundry starch in 1 gal. of water, and adding 1 oz. of potassium iodide. A drop of this solution spotted upon the cloth will always give a blue color where chlorine is present.

From the appearance of the sample submitted, it is evident that you do not blue your cloth before finishing. A small amount of bluing will overcome the creamy cast that is always present to a certain extent and give the finished cloth a clear snow-white appearance. The best bluing for this purpose is, in our opinion, a good grade of ultramarine blue, as it will not streak but will penetrate thoroughly and evenly and may be applied in a string washer. The best amount to use must be found by trial.

To sum up, you must have the goods thoroughly and evenly

boiled-out to obtain the basis of a good bleach; then the chemic must be of sufficient strength and the cloth must be allowed to stand in the air long enough for the bleaching action to be thorough and complete. Finally, a slight bluing will overcome any yellow cast remaining in the goods, and give a clear even white. We are sending a sample of bleached fabric which you should approach in appearance if the above directions are followed.

Rayon Hose Tendered

I am having repeated trouble on this style of mercerized hose, with a plated 150 denier viscose rayon top. These hose are half bleached as below, and then dyed. If you can help me locate the source of this trouble, which is causing the rayon plating to be torn and tendered, I will greatly appreciate your assistance. These goods were carried through the following operation in a cypress boil-out tank (half bleach):

Entered in 140 gals. water at 110 deg. F., 2 lbs. solozone added slowly, stirred for 5 minutes, 1 lb. silicate of soda added to water, stirred well, heated to 170 deg. F., 3 lbs. of 50% T. R. oil added, boiled one hour, drained and washed well, placed in a monel metal paddle machine containing previously dissolved dyestuffs, boiled for 30 minutes, no salt used. (5508)

We have closely checked over your operation of half-bleach and dyeing of this material. As you no doubt know, the less time you can run rayon through the wet processes the better and stronger it will come out in the finished product. We would suggest, therefore, that you run the amount of chemicals used just as low as possible, also cut down on the boil to three-quarters of an hour instead of one hour. In dyeing, run the goods just under the boil instead of boiling them. Check up each step carefully, and make all possible speed.

Twisting Cotton Yarn

We are interested in the purchase of equipment for twisting 8s single cotton yarn 6 cord. We are interested in handling this number in the most efficient way and feel that perhaps there is better equipment than we are now using. We are now running 24 hrs. a day and will have to purchase in the near future and hope for immediate advice. (5539)

For the common 6-ply yarns use multiple winders and ring twisters. Another method would be to use spoolers, warpers,

and twist from a beam. The inquirer does not say what he is now using or for what purpose the yarn is to be used, but we have sent the names of various machinery builders.

Bleaching and Dyeing Rayon Fabric for Underwear

I would appreciate all the information you can conveniently give me on bleaching, boiling-off, and dyeing of rayon in the piece for ladies' underwear. I am a dyer of wool piece goods and would like to enter the rayon field. I refer to peroxide bleaching. (5550)

In nearly every mill using rayon today the skeins are either bought oiled, or oil is applied when they are to be wound preparatory to knitting. This oiling is necessary principally to remove the liveliness of the rayon and make it soft and flexible so that it will wind and knit with the least possible breakage. Rayon has a strong affinity for oils which are not easily scoured out, especially if the oil has remained in the fibre for several days. Oil should be scoured out within the first 30 hours after oiling to insure the best dyeing results. A practical formula for scouring rayon is 5% to 12% of olive oil soap and ½% to 1% of soda ash. Ratio of bath 1:25, the percentages figured on the weight of the material. The pieces are run in this bath from 20 to to 30 minutes at a temperature of 150 deg. F. Two good hot water rinses should be given the pieces and one cold rinse, so as to insure complete removal of the soapy scouring liquor.

Bleaching of rayon with hydrogen peroxide is effected in the following manner: To 100 to 120 parts of water add enough waterglass to make the bath slightly alkaline, and then add 20 to 30 parts of hydrogen peroxide (containing 12% by volume of H_2O_2). The temperature should not be raised above 100 deg. F., and the bath should be tested from time to time to see that it is on the alkaline side. The bleaching time varies between 2 to 4 hours, and is determined when the desired white is obtained. The material is then scoured in a 3 deg. Tw. sulphuric acid bath, and then given a good wash to remove all acid.

In the dyeing of cellulose silks, it is advisable to use sulphonated oil or neutral soaps, as they aid to a better penetration of the dyestuff on the fibre and a better leveling, and also remove any harshness which the fibre may have. Finally, the

fastness to washing is increased. For dyeing compound shades, the following recipes are giving good results:

For Light Shades

½% soda ash
2% phosphate of soda
2% neutral sulphonated oil
Temperature 80 to 110 deg. F.
Time, 30 min. to 1 hr.

For Medium Shades

¾% soda ash
5% phosphate of soda
2% oil
Add 3% crystal glauber's salt during last 15 min. of dyeing
Temperature 110 to 140 deg. F.
Time, 30 min. to 1 hr.

For Dark Shades

½% soda ash
1%phosphate of soda
2% oil
Add gradually 10% to 15% glauber's salt
Temperature 140 to 160 deg. F.
Time, 30 min. to 1 hr.

In dyeing light and medium shades, the bath should be "long," due to the affinity the direct colors have for rayon, while for dark shades the bath should be somewhat on the "short" side.

Blends Prohibit Woolen Strength Standards

I am particularly interested in knowing the standard tensile strengths of a sixteen cut (100%) woolen yarn, and of the fabric made from the same yarn (used in both warp and filling), weighing 10½ ozs. finished, and woven plain weave? (5529)

There are no standard tensile strengths of general application for woolen yarn or fabrics, as there are no two mills making the same size yarns that use the same materials in making blends for these yarns. For instance, one mill making 16 cut yarn may be using 100% of various kinds of wastes, such as garnetted yarn wastes and noil or shoddy, and another mill making 16 cut yarn may be using 100% pulled wool. In

these two instances the breaking strength of these two yarns will not be the same, yet each may be satisfactory to each manufacturer. Mills which use standards for testing yarn and fabrics have devised these standards for themselves. If one were to make a 16 cut yarn and the tensile strength should be 55 lbs. by agreement, it would be necessary to select the particular wool that would produce the above breaking strength. The selection of stock is the most important factor, and second in importance is the twist.

Handling Hosiery in Finishing

I would like to know what is the best way to run a finishing room to keep from having odd stockings or pieces of lots left over? I would appreciate anything you could tell me. (5541)

We have sent the inquirer an article from the June 22, 1918, issue of TEXTILE WORLD, covering this subject. We might add that the best and safest way to run a finishing department is to employ a practical experienced finisher. This is very necessary for economy. Such a man will know at once if there is anything wrong with the unfinished goods, and in following them through the various departments can at once place the faults, if there are any, and therefore avoid repetition. Then again, sometimes there is carelessness in handling the orders, such as giving the same order twice, or even the knitter will run a few stockings extra. There will always be some odds but a practical man will make them salable.

Carbolic Acid in Size Mixture

I would appreciate it if you would kindly advise if, in your opinion or from your experience, carbolic acid is desirable or not in a size mixing for cotton yarns. (5556)

We do not know of anyone using pure carbolic acid for sizing cotton yarn. This acid is a very powerful antiseptic and much too strong for cotton yarn. Though used by some slashermen after being diluted with water or some kind of oil, these substances have no antiseptic value and therefore are of no use for this purpose. Carbolic acid is also injurious to the skin if not handled carefully.

We quote here a few lines from the book, "Chemistry and

Practice of Sizing," by Percy Bean, on this subject: "It is too dangerous to experiment with substances like sulphate of copper, carbolic acid, boric acid, etc., etc., in goods which are intended for shipment to hot countries, like India. During the war, manufacturers faced with a shortage of chloride of zinc, did experiment with carbolic acid and other antiseptics in medium and heavy size mixings. In many cases their goods were found to be damaged by mildew growths when the bales were opened in India."

In our opinion, the best antiseptic for cotton yarns is acetic acid. It is the acid most commonly used, and is a colorless or slightly brownish liquid, readily soluble in water. It is also useful in brightening colors and acts to make starch paste thinner, which gives it better penetrative qualities.

Printing Elastic Web

Enclosed please find a small sample of elastic web that I am trying to print designs on by the intaglio process. I have run the copper shell in the ink pan with the doctor knife cleaning off the excess ink, then again with the shell inked with a composition roll and with a brush; but the whole trouble seems to be that, no matter how clean the shell looks when the goods are run through, they have a slight smudge. While not so noticeable when alone, a dirty smudge is apparent when put beside a piece not printed. I have used half a dozen different inks and the result is the same. The design and printing are clear enough but there is always a slight smudge on the goods. I can't see how it can be otherwise, for oil will run around almost a driving fit and all ink has a more or less oily body. I cannot see how that smudge can be helped, although it does not look right and I understand the other fellow's goods are clean. The doctor blade fits the shell so tight that light cannot be seen between them. The shell is between 3 and 4 in. long. The pressure roll, a wheel, is now covered with a couple of thicknesses of cloth. I have also tried on this, cloth, felt and paper, but it gives as good results with cloth. Would rubber cloth be any better? I have been told that some use rubber type to print designs on such light bleached cloth. How fast should the shell run to get best results? What should be the slowest speed? Any and all information that you can send me will be greatly appreciated. (5560)

A printer replies to the question as follows: Although we do not use inks here in printing, the principles involved are of

course the same. We often encounter very similar difficulties and usually when we are employing concentrated basic colors. All of our engraving is of the intaglio type. There are several remedies, one of which is usually effective:

(1) The ink may be too thin for the doctor to clean smoothly; thickening with tragacanth may help.

(2) The copper must be absolutely free from the slightest scratches or markings at the start.

(3) It may be of advantage to use a cleaning doctor of less weight or thickness so that it will hug the roller more closely; also hang good weight on the doctor.

(4) Warming the color is also effective. Run it at machine fairly hot.

(5) Nickel plated rollers are frequently employed to advantage.

(6) If color shows tendency to dry quickly by evaporation of solvents, addition of glycerine is good.

(7) Have good soft backing or padding on cylinder and use as little pressure against cloth as possible. Naturally the greater pressure of copper roller against cloth the greater the tendency to tarnish.

(8) Speed has not so much to do with it. We would with our equipment do 1800 or more yards an hour.

Gray Streaks in Rayon Knitted Fabric

We enclose herewith sample of artificial silk knitted fabric which has been dyed. As you will note there are gray streaks in this material which are causing the customer considerable uneasiness. In view of the fact that there are thousands upon thousands of pounds of artificial silk dyed daily in our machines, we are rather loathe to credit the uneven dyeing to the operation of the machine, and believe that some other reason exists. The silk, to the writer, appears quite harsh, and does not have at all the feel which it should have if it were properly made and prepared. It is the writer's opinion that these streaks can be traced to preliminary treatment before dyeing, but this may not be the case. (5561)

There are several causes for unevenness in the dyeing of rayon, such as the following:

(1) The dyestuffs may have been added carelessly or not thoroughly dissolved.

(2) The wrong selection of colors has caused uneven dye-

ings, especially when dyeing compound shades. Many direct colors which dye satisfactorily on cotton have a tendency to go too quickly on rayon. This is especially true when such colors are to be used for final shading.

(3) The cloth may lie around, after the scouring, so long that it partly dries up. If the cloth is not wet out again thoroughly just before dyeing, it will come shaded, at least in light and medium shades, the dyestuff going first on the wet places, leaving the dry places lighter colored.

(4) Too much salt added at once will cause the dyestuffs to be forced on too quickly and unevenly.

(5) Temperature is a big factor in dyeing rayon. If raised too quickly the color will again go on the fabric unevenly, especially in light and medium shades. Temperature variations in the machine will also cause differences in the shade.

The sample of rayon fabric submitted has the appearance of cloth in which the defect may be traced to No. 3, but it would be well to check up each cause stated above. A method of leveling shaded dyeings, that is easier and cheaper, and gives much better results than soaping, is a 10 to 15 minutes' treatment at 140 to 160 deg. F. in a bath slightly acidified with muriatic acid, 1 pt. per 200 gals. of water. To restore the original shade, a little sodium carbonate is added to the bath. If shades are too uneven to be leveled the rayon should not be stripped, but thrown into a dark shade. The harshness will, no doubt, disappear when the trouble is found and corrected.

Formulas for Random Dyeing

One of our customers has asked me to get information for him concerning the mixture of dye for random dyeing cotton yarns for underwear work, such as are used in connection with random dyeing attachments. I would appreciate very much your early reply giving me complete information regarding the proper mixture for blue and gray dye for random dyeing. We understand that the dyestuff is mixed with wood alcohol and are anxious to secure information in regard to where the dye can be purchased and the formula for mixing same, covering number of ounces of dyestuff per quart or gallon of alcohol.

(5530)

The following formulas are suitable for random dyeing: For gray random, to every 2 gals. completely denatured alcohol, 2 qts. water, and ¾ qt. glycerine, add 1 oz. gray dye.

For blue random, to every 2 gals. denatured alcohol, 2 qts. water, and ¾ qt. glycerine, add ¾ oz. blue dye.

In making up a batch, add the dyestuff to the glycerine, stir well, then add the water and stir well until the glycerine is all dissolved in the water, and then finally add the alcohol and stir until thoroughly mixed.

Breaking Strength of Ply Cotton Yarn

We would appreciate it very much if you could give us a table or a rule for determining the breaking strength of 3-ply twist cotton yarn. (5552)

A table of strengths for 3-ply yarns has never been worked out, to our knowledge. We have at hand a small amount of data covering 2-ply yarns made from 1 in. carded cotton. From the data at hand it appears that when 1 in. cotton is made into a carded 2-ply yarn, using warp twist in the single and a similar twist in the ply, the strength of a skein of 120 yards, may be calculated approximately by using the following formula:

$$\frac{1900 \times 2}{\text{No. single yarn}} = \text{lbs. strength of 120 yd. skein}$$

such as is usually used in breaking tests. It might be well for you to substitute 3 for 2 in the above formula and proceed to establish your own standards of strength.

Scouring Pulled Wools

We would like some information on the best alkali and soap to use in scouring pulled wools. The soap liquor is made up of 1 lb. soap to 1 gal. water. The soda ash liquor is made up of Solvay's 58% soda ash to 2 gals. of water. How much soap and alkali liquors would be necessary for a 4-bowl scouring machine? How often should alkali and soap be added? How often should the water be changed? For pulled wools, medium quality, the first bowl contains about 3,000 gals. of water at 120 deg. F.; the second bowl contains about 2,500 gals. of water at 125 deg. F.; the third bowl contains 1,800 gals. of water at 120 deg. F.; and the fourth bowl contains 1,200 gals. of water at 110 deg. F. Would you add ammonia in the second bowl? Would you use different amounts of soap and alkali for pulled wools—lime depilatory and sweated processes? Should you use more or less alkali and soap for pulled than

fleece wools? How much wool will a scouring machine scour in 8 hrs.? (Medium quality pulled and South American medium quality fleece.) What percentage of moisture should be left in wool after it comes from the dryer (medium quality pulled)? (5540)

The inquirer apparently is scouring South American pulled wools obtained by the use of different forms of depilatories; namely, the lime or the sweating process. In the sweating process the flesh side of the skins are usually painted with arsenic solution and for such wools it would be satisfactory to use soap in the first bowl of the scouring machine. On a wool removed by sulphide and lime, no soap should be used in the first bowl as a lime soap would be formed which would be very difficult, if not impossible, to remove. In fact, it is the practice of some scouring mills to use nothing but warm water in the first bowl, with soda and soap in subsequent bowls.

Relative to the amount of soap and alkali for a 4-bowl scouring machine, this is a variable quantity dependent on the wool being scoured. It is obvious that the greasier wool will require more scouring materials. In general, it is desirable to make the first scouring bowl contain the most highly concentrated scouring liquor because at this point the wool contains natural grease which protects it from any detrimental action. Enough soap should be used to form more or less of an even coating of soap bubbles on top of the scouring bowl. For very greasy wools some mills use nothing but soda ash in the first bowl; in the second, equal quantities of soda and soap; and in the third bowl, soap alone; in the fourth bowl a running water rinse. The temperature should not at any time exceed 125 deg. and preferably should be somewhat lower. An experienced scourer will be able to get brighter wools by varying the temperature in the different bowls. I know of no way to set a hard and fast rule as to just how this may be done.

The inquiry merely states that to a gallon of water, 1 lb. of soap is used, without stating the kind of soap. We assume that some good red oil or olive oil soap is being used, in which case the quantity is quite all right although it might easily be increased up to 2 lbs. per gal. of water for economy in making the soap liquor which could then be added to the scouring machine in the proper amount. To be specific, the first bowl might contain 10 pailfuls of soap and 20 pailfuls of soda ash

made up in the quantities indicated; the second bowl, 20 and 20, and the third bowl 20 pailfuls of soap.

The use of ammonia in the second bowl merely is in the way of an additional alkali and is not commonly used. It has no particular benefit over sodium carbonate and at the temperatures used would be lost rapidly. The capacity of a 4-bowl scouring machine depends entirely on the kind of wool scoured. As much as 10,000 lbs. could be produced of a low shrinkage wool, and from 4,000 to 5,000 lbs. of a high shrinkage wool.

As the wool goes into the dryer, it should be exposed to the highest temperature and lowered gradually toward the point of exit. It can be seriously damaged if all the moisture is removed from it. The usual practice is to store the wool until a regain of approximately 12% is received from the bone dry basis. Wool from the dryer might well contain as much as 5% moisture.

If a milder action is desired than that secured with ordinary soda ash, most any of the crystalline varieties such as Gran Carb. of Soda or Monohydrate of Soda will do the work.

Moire Finish

I am enclosing herewith a sample of moire finish and would appreciate your obtaining me some information as to what would be the best methods to adopt to imitate this finish, and also the machinery required to handle this class of work?

(5557)

The sample of cotton goods showing moire finish is a high grade product and shows the results of being well mercerized. Unquestionably it is a full bleached product with regular caustic bleach and chlorine or chemic. After dyeing, the goods are given a treatment with some softening oil and passed over a tenter to obtain width; from here they are conditioned with the necessary amount of water; calendered on both sides of the fabric with a 5 roll calender; again conditioned and taken to a beetling machine.

The moire pattern is distinctly a beetled effect. The writer would say that the goods have probably been beetled about 4 to 6 hours, rewound, and beetled again 4 to 6 hours on the other end. This finish cannot be really imitated on a calender by either embossing or passing two thicknesses of goods through the same calender, commonly resorted to for the

imitation of moire finishes. The fabric as shown by the sample is very "thready" in pattern and has a full leathery handle so common to the so-called beetle finishes.

Mercerized Skeins Stained After Dyeing

I am sending you a skein of cotton yarn, mercerized and dyed, and you will note that outside of the skein are red streaks. I would like to know what the trouble comes from, from the mercerizing, or from the dyeing, and what is the cause of it? (5547)

In our opinion this skein has been stained after dyeing, while still wet, and after stating the reason for this conclusion we think the inquirer will agree with it. In the first place, it does not look like a mercerizing fault or like ordinary unlevel dyeing. The most prominent stain is on the outside at one end, and not only the yarn but the tie-band is stained. That immediately lets out the mercerizing, because yarn that has been processed under such different conditions as the tie-band and the body of the skein, would not show a mercerizing fault in so exactly the same way.

Under the other tie-band there is a pronounced light place which might imply insufficient manipulation in dyeing. But such a pronounced red should not be used in dyeing a shade like this, and if it were and came out as badly as the skein submitted, one would expect to see bluish or yellowish streaks also, from other dyes used in the combination.

It is more likely that this has been stained after dyeing but probably while still wet, by coming in contact with red dyed material, dye tub or sticks stained with red dye, a truck that has been used for red, or something else of that nature. To sum up, it is certainly not the mercerizing, it might possibly be the dyeing, but is more likely a surface stain.

Dirty Slubs in Cotton Yarn

Will you please tell me what causes the dirty slubs in the yarn in the samples enclosed, and how to remedy the same? I have marked these as warp and filling. Any information in regard to this matter will be greatly appreciated. (5572)

The slubs of dirty cotton seem to divide themselves into two groups. One of these groups is made up of short soiled cotton

fibres which form bunches on the yarn. These dirty spots are somewhat loosely bound into and on the yarn. They have the appearance of being made up of such material as clearer waste. The other group of soiled spots appears to be the result of piecing up an end with soiled hands. At such places there seems to be a slight disarrangement of fibre as might occur at a piecing, but there does not appear to be any accumulation of short fibres as at the bigger spots.

Scouring Rayon Fabric

We are enclosing two samples of rayon cloth with oil spots. The trouble seems to be with the soap or water. The water we have in this locality has so much lime in it we think this may be the cause of the trouble. Could you obtain any information on how to overcome this for us? We are using a potash soap with the temperature of the water at 120 deg. The oil on the cloth is an oil used to treat the yarn before it is knit. (5566)

The method of scouring that you are using is not efficient enough to remove all the oil from the fabric. We would recommend the method given below as one that is working out very satisfactorily on a practical scale. Make up a stock soap liquor with 100 lbs. of a good white chip soap—or the soap that you are using now if it is a good grade; 25 lbs. trisodium phosphate; 10 lbs. soda ash, the whole made up to 100 gals. with water, being sure to effect a good solution of all ingredients. Scour for one-half hour at 140 to 160 deg. F. with the addition of one pailful of this soap liquor to the water. Ordinarily, one pailful of soap will be sufficient to scour 100 lbs. of rayon, but more may be added if necessary. Throughout the scouring operation there should be a good thick lather on the soap bath. Wash with hot water until the soap is all removed and then give a cold rinse.

It is very difficult to obtain a satisfactory result on goods where hard water is used. The lime in the water forms with the soap an insoluble calcium soap in the form of sticky curds which are practically impossible to remove without permanent injury to the fabric. The very best and, in the end, the cheapest solution of this difficulty is to install a water softening apparatus to insure a supply of clean soft water. Another method, but one which is only a make-shift at the best, is to

soften the water in the washer before the addition of the soap. This may be done by the addition of small amounts of soda ash or silicate of soda, the amount used being dependent upon the degree of hardness of the water. Care must be taken not to obtain much of an excess of these alkalies as the rayon would be harmed in scouring. This same procedure will have to be followed with the rinse waters until the soap has all been washed out of the fabric. It can readily be seen that the time involved would soon pay for a softening apparatus.

If the method of scouring recommended above is used, in conjunction with clean soft water, you will obtain the rayon in a clean soft condition ready for bleaching or dyeing as the case may be.

Uneven Filling in Rayon-Filled Cotton Fabric

Please examine the enclosed sample of rayon-filled cotton fabric and state where the blame should be laid for the great number of horizontal streaks. (5567)

One edge of the circle marked on the swatch touches a shiner which is about 3 in. long, and the rest of the pick on which the shiner is located is perfect. The other edge of the circle touches a miss-weave or broken pick in the cloth. This is not a shiner. It looks as though the filling has broken or become exhausted and the weaver has failed to match the pick. The back of the cloth will show where the pick is broken better than the face of the cloth.

We do not know whether the fault is being found with the small shiner, the broken pick, or the irregularity in the size or count of the filling. If you are finding fault with the small shiner, the blame can honestly be laid on the quality of the filling. The fault of the broken pick can be laid to the weaver. The most serious fault in this swatch seems to be the irregularity of the size or count of the filling. The count of the filling seems to range from about 150 denier to about 100 denier. This can be seen by the naked eye and shows up glaringly under the glass. The quality of the filling is very poor.

The defective filling, as it appears in the swatch that was submitted, is visible to the naked eye, not as shiners, but as an irregularity in the diameter of the thread. If the fault was in the shuttle or loom, this irregularity would show for the

period of one entire cop; for it is hardly logical to suppose that the friction in the shuttle would change during the weaving of one of two cops. The thread is very uneven, having a thick and a thin place for certain lengths. Weaving this cloth on a box loom would not remedy the defect, and, as a matter of opinion, we would say that weaving this filling on a box loom would make the cloth look worse than it appears in the swatch.

The thin places in the filling, where the thread appears off count, is woven loose with no appearance of too much friction in the shuttle. The thin threads have the same luster as the thick threads. It seems out of reason to blame a loom or shuttle for uneven sized filling. The picks from the same shuttle and cop will be placing many inches of filling in the cloth. Some of these picks are defective and some are all right. If too much friction is being applied by the shuttle, it is reasonable to expect the same friction from the beginning to the end of the same cop.

We are submitting a swatch with an 8 end sateen weave, same weave as in the swatch that you submitted. If this swatch was woven with defective filling, the thin streaks would appear as bad if not worse than those in the swatch that you submitted. You will note the even size of the threads in the swatch that we are sending you. This is not due to any particular care of the friction in the shuttles, but is due entirely to the quality of the artificial silk filling. The selvage on the swatch that you submitted is not the correct selvage for this type of weave, but this would have no influence on the body weave.

Oil Causes Yellow Tinge on Wool

We have trouble with lots turning yellow, a defect which shows up most prominently in white mixes. We first noticed it on bobbins in the spinning room, there being variations in the same mix. We take extreme care in mixing the lots in the picker room. We use a heavy lard or grease oil in the picker room, and with the most careful fulling and scouring we cannot get it entirely out of the finished pieces, which show a yellow cast on practically all of the finished pieces, giving them a dull, lifeless look. Enclosed find two reelings of yarn from same lot. You will notice one is more yellow than the other. Has carbon tetrachloride ever been used in the washer, and would

it be practical? Is carbon tetrachloride superior to ether in removing stains at the perch? (5564)

From the description of your trouble it seems that the difficulty arises from the heavy lard or grease oil used in the picking room. It seems advisable to discontinue the use of this grade of oil and use a lighter grade of good saponifiable oil in the form of an emulsion of 50% oil to 50% water. It does not seem advisable to use tetrachloride in the washer, especially not on colored goods. Ether is considered milder in its action on the cloth than tetrachloride for the removal of stains.

Specks in Woolen Goods

We are running 1/28 cut yarn, A. A. super wool in heather mixes, using about 25% to 35% of the wool white, and the balance dyed various colors. We are running same on a 60 x 60 card, using 32, 33 and 34 gauge wire on the first, second and finish cards, respectively. We are not using the tape condensers. Our difficulty lies in the fact that when the cloth which is made from this yarn is finished, a number of white woolen specks are in evidence, which require considerable hand speck dyeing to eliminate. We are unable to card these small specks out, and trust that you can give us some advice which will enable us to make things right. We are not using noils nor reworked stock. (5563)

It may be that there is present in the wool some short undergrowth which is oftentimes the source of such difficulty. Set the card closer to thoroughly card out and blend the stock. The fancy on the card may be responsible for the specks, which may not be noticeable unless carefully looked after. Owing to the fact that the larger part of the stock is colored, the white would not show up prominently until after the goods are washed.

Cotton and Rayon Sock Unevenly Dyed

I am sending you a sock which is stained on the high spliced and double sole. This is due to the fact that the cotton used protrudes from the artificial silk, and once the sock is dyed the difference in the color of the cotton and the artificial silk is plainly shown on the high spliced heel and double sole. It is a very noticeable defect. The yarn used in the sock referred to is artificial silk No. 300, and mercerized cotton 60/1.

Please explain how to avoid this defect? Also kindly inform me what kind of oil to use in a circular knitting machine, so that it may be dried and washed thoroughly without staining the sock? Olive oil has been recommended to us. (5574)

From all appearances you are not using the proper dyestuff for coloring your hose; or, if you have the proper color, your temperature is not correct, as the cotton yarn shows up darker than the rayon. As a rule, artificial silks are dyed in more dilute baths than other textile fibres, with less addition of salt and without high temperatures, keeping down the alkalimity and mineral acidity of baths. Therefore, dyestuffs must be carefully selected in order that these conditions will exist in dyeing. You must find either by experiment on your part, or by submitting your problem with samples of your hose before processing to the application laboratory of a dyestuff company, the proper color and temperature which will dye your cotton and rayon yarns the same shade.

In regard to an oil for use on a circular knitting machine, would state that olive oil is good, as it will wash out with soap. We believe you should also get in touch with a good oil company, as they usually have a compounded oil which they call stainless oil, at a cheaper price which is just as efficient.

Waxing Worsted Knitting Yarn

I am buying all my yarns wound on cones, as I do not have a winder. All this yarn is not properly waxed, consequently, I have all kinds of trouble in using it on the knitting machines. I have tied a piece of wax on the yarn stand so the yarn could run over it before entering the needles; but in time the wax wears through, and, as soon as a knot comes, the yarn gets caught in the wax and sometimes breaks. Could you tell me if there is some kind of a liquid wax or oil I could use through which I could run the yarn before it goes into the machine, or if there is some other way to wax the yarn? I am using all dyed yarns, worsted 2/20, 2/26 and wool 2/20 for sweaters and jerseys. (5576)

The writer does not know of any liquid waxing preparation for worsted knitting yarns. You might use the type of oiling device used on automatic hosiery machines. This consists of a small bottle with a wick projecting from the top over which the yarn passes. The oil in the bottle is drawn up by the wick

and is in turn absorbed by the yarn. The quantity absorbed is dependent upon the speed at which the yarn is drawn over the wick.

Best of all, we think you could use a small waxing device sometimes applied to winders. This has a small flat surface with a post about one-half inch in diameter in the center. A small, flat, circular cake of wax is used. There is a hole in the center of the cake large enough to fit over the post, so that the cake rests on the smooth metal surface and may turn about the post as a center. The yarn passes under the wax. The weight of the wax cake gives contact with the yarn. Freedom to turn overcomes the cutting into the wax at any one point. These may be obtained through manufacturers of winders.

Leg and Foot of Silk Hose Differ in Shade

I am enclosing sample of fabric as made on a split foot machine. You will kindly note the high splice and foot is darker than the boot. On examining this fabric you will notice the tightness of stitch is the same in the high splice foot and boot, hence I am of the opinion the darkness in the high splice and boot is caused by the denier of the yarn of the silk from this cone of yarn being either less or greater than the denier of the yarn of the cone of silk used for the boot. I would be pleased if you would examine this fabric and verify my opinion as to why this hose is a substandard. (5577)

On close examination of this sample, we would say the difference is caused by a heavier yarn used in knitting the foot. The two different motions of the machine in knitting the leg and foot might make some difference, the one being circular, the other reciprocating. Proper choice of the yarns used and a uniform tension on the machine should overcome this defect.

Weak Brownish Spots in Silk Yarn

We are silk throwsters and are requesting information in regard to the so-called burnt spots on crepe yarn. These spots are brownish, and are the cause of excessive weakness in the yarn, which, when containing them, has practically no tensile strength. The yarn can be broken down by bending between the two thumbs and forefingers, and with this done, the two ends show, not the usual effect of split fibres, but more the appearance of carbonized cotton in silk waste. This defect

occurs usually after the yarn has been put on bobbins, and occurs, disappears, and then reoccurs in the different throwing mills without any indication that we have been able to check up on as regards seasonal heat or cold. We believe, however, that the burnt spots are present only in silk which has stood in storage for some time in the raw, or else has stood as thrown silk for a longer period than usual. (5590)

As this damage presumably affects the entire thread of yarn at spots where the defect occurs in the thrown silk (crepe twist), it is apparent that the trouble can neither be in the raw silk, nor in the mechanical operations of throwing, nor due to any stress or friction to which it may have been subjected in any of the throwing operations, since it is stated to be observable only after the final twisting of the yarn after it has been wound on bobbins. Where you say that it occurs, disappears, and then reoccurs, I infer that you mean, not that the individual spots disappear, but that the trouble in general occurs, and then goes away, and then reoccurs.

From the statement made that the defective spots are only found in silk which has been stored for some time, it would seem quite apparent that the weakening was due to some mildew or bacterial growth, probably the latter. This, in turn, will bring up the questions of the conditions of storage, and of the influences which otherwise would cause less trouble. Ordinary mildew, from dampness, may collect on the outside of the bobbins, but you say nothing to indicate that the trouble was only on the exterior of the bobbins; and, also, ordinary mildew does not seem to affect the strength of the silk, nor would it cause this kind of local spotting.

It would seem, on the face of it, that the trouble is most likely to have its foundation in some ingredient, or reaction of one ingredient on another, in the materials used in the soaking bath. From this angle, the matter might well be submitted to a chemist skilled in organic chemistry. If the inquirer does not wish to make any change in the materials used in his soaking bath, there might be added to such a bath some antiseptic—formaldehyde, or what not—such as is used by the cotton manufacturers in the slashing or dressing of their warps, for the purpose of preventing the development of mildew on the yarns when using heavy sizings or dressing on them. It is the practice of some throwsters in making crepe yarns, and after the twist has been put in, to soak the bobbins

in a suitable solution for the purpose of setting the twist. Other throwsters, however, accomplish this by steaming, using steam pressure sufficiently high, perhaps 60 lbs., more or less, to permit the steam to penetrate through the bobbins.

You do not state what treatment you give to the yarns for this purpose. If soaked, of course, there would be nothing to prevent the bacterial growths referred to if the conditions should warrant their development. If steamed, however, it would seem that the heat and penetration of the steam might possibly be efficacious in preventing this. All kinds of fungus spores may be present in the atmosphere, some localities and some buildings possibly having them in quantity; and these, finding lidgment on the threads in work, would in the course of time develop. I think, therefore, that if you will investigate this trouble along the lines indicated above, you will be able to get to the root of the matter.

JAMES CHITTICK.

Holes in Dyed Jersey Cloth

I am enclosing herewith two samples of knitted fabric produced on a 24 gauge latch needle machine and constructed of 2/40s French spun yarn. The colored sample has been finished, fulled and dyed, and you will notice contains a large number of small holes. Will you please give us your opinion as to whether these were caused in the knitting or the dyeing? We should also appreciate an explanation of the fault. (5583)

It is our opinion that the trouble is caused in the knitting of the cloth, or is due to the use of imperfect yarn. By holding the gray cloth up to the light you will notice that the knitting is uneven or rowy, and you will notice where it is rowy he fabric is very thin. In the finished piece the holes come where the cloth is the thinnest or weakest. One thing which we believe causes this condition is that the stitch wheel is not properly adjusted.

The character of the holes varies somewhat. A few of them were apparently caused by a burred or rough wheel on the knitting machine. It has nicked the yarn just enough so that it will not stand up during the dyeing and finishing, and the results are holes in the finished goods. If the goods come to the dyer in good condition as they should, there really is nothing to cause the condition as shown in the sample. You will get holes caused by nails in the kettles, fulling mills, etc.,

or sometimes needles are left in the cloth. Generally, when you find a hole caused in the dyeing or finishing it is fairly large and easily distinguished from a hole caused by poor knitting.

There is a possibility that the trouble is largely in the yarn, and if you will send us sample skeins from several cones, or better yet, send us several cones of the 2/40s French spun yarn, we shall be glad to examine them with this possibility in view. The cones do not need to be full.

Stockings Dyed Differently in Same Batch

We are forwarding two stockings for your inspection. These stockings were taken from a batch returned to us by our dyers, and we are writing to ask you what you think is the cause of the difference in color, when the dyers assure us that they were dyed at the same time and in the same bath. In answer to our complaint, they expressed the opinion that the yarn used in knitting the hose was different, but such is not the case, as we use only the one quality of silk and the counts of mercerized yarn are alike. Kindly let us have your opinion at your earliest convenience. (5580)

The trouble with the samples referred to is evidently due to the dyeing. The method of dyeing is not given, but apparently the stockings are dyed in the usual type of rotary dyeing machine. The trouble might be caused by the machine stopping long enough to allow the dye to penetrate one part of the batch more heavily than the rest. Or addition of the dye to the bath too suddenly and dyeing of the batch too quickly are other causes. We are inclined to believe that the last mentioned might be the cause, as the samples are not dyed evenly, some parts being heavier than others.

Stains on Stockings Due to Loose Dyestuffs

We are enclosing two stockings made of combed cotton and worsted yarns, showing some bright yellow spots. Our dyer claims that these are due to dye spots in the cotton, but on the enclosed stocking you will please note that there are bright yellow spots on the heel and toe which are made of two ends 30/2 spun silk. We would, therefore, like to have you kindly advise us exactly what seems to be the trouble, as this seems to be only on one lot of bleached goods, while the other lots made of the same kinds of yarn came back from the bleach

house perfectly clean. We do not do our bleaching and dyeing ourselves. We send it out. (5585)

By actual test the stains are definitely established as being dyestuff. It is apparent that at some place in the inquirer's plant direct or aniline yellow in powder form is being used and particles of it are floating around in the air, some of which are alighting on the hosiery after it has been made up. It would appear to the writer as though this dyestuff were striking the stockings in their rough knitted form, and when they are finished or pressed and subjected to steam the dyestuff becomes partly solvent and very fast. The stains are not affected or removed by using hot soap and water, and, in accordance with the usual conditions on spots of this kind made with direct or aniline yellow, when subjected to treatment with chlorine they become considerably brighter.

It is difficult, of course, for an outsider to designate the exact source of the trouble, but the writer would recommend that investigation be made at every point where dyestuff is either being stored or used to see that none of these finished socks or stockings are allowed to lie anywhere near the storage point of dyestuffs. Care should be taken that dyestuff which is being weighed or moved is not shaken up too much or disturbed.

Dyeing a Mixture of Viscose and Celanese Fibres

We meet with a problem among the woolen manufacturers to whom we sell garnetted rayon of a dye situation, whereby waste produced by the Viscose process and waste produced by the Celanese process are very often blended together. This has caused considerable difficulty in suitable dyeing for the woolen manufacturers requirements insofar as finding a dye to take effect uniformly on rayon of both the above processes.

If you are in possession of any information of a dye suitable to eliminate the trouble as described, we would be more than pleased to hear from you in this respect as we would then probably be in a position to develop a good deal more business than we have been able to do up to the present time. (D136)

We note that some of your clients are experiencing difficulty in the use of waste representing a mixture of Viscose and Celanese rayon. This is not surprising as the former is a regenerated cellulose and the latter a cellulose acetate; and the two materials react differently to ordinary types of dyestuffs.

It happens that the American Cellulose & Chemical Mfg. Co., 15 East 26th St., New York, manufacturers of Celanese, have developed a range of special Celanese dyes called SRA dyestuffs. A uniform shade can be obtained in one bath on a mixture of Viscose and Celanese rayon if the proper direct cotton dye is used for the Viscose and the proper SRA dye for the Celanese. Consequently we suggest that you have your clients get in touch directly with the American Celanese & Chemical Mfg. Co., who are in a position to supply shade cards and instructions for use of their special dyes.

The dyeing of such a mixture requires a little experimentation in advance because often a direct cotton dye will contain a small amount of basic dye as an impurity; this might stain the Celanese a different color. However a little experimentation at the start and conference with the Celanese people themselves will, we are sure, enable your clients to secure a uniform shade on a mixture.

Bleaching Cotton and Worsted Hose

We are enclosing two stockings made of combed cotton and worsted yarns, and would like to have you advise us what would cause the blotches on same. You will also please note on the foot the way the wool has taken a different bleach from the cotton, while in all the other lots which we get back from the dyehouse they come out perfectly even. We do not do the bleaching ourselves. We sent the stockings out. (5592)

The blotches on the upper or leg part of the stockings are caused by an uneven temperature in the bleaching receptacle. This may be caused by turning the steam on while the goods are in the bleach and not stirring the mass, or by the steam pipe entering on the inside causing the liquor next to it to heat more than the rest. The cure is a thorough poling of the goods so that a uniform temperature is obtained throughout the vat.

Regarding the feet, the regularity of the white and cream colors indicates a mechanical error. There are three or four wales of cotton, then from one to three or four wales of wool exposed to the eye. The cotton will always bleach whiter than the wool. To make it less noticeable, we would advise using a weaker bleach liquor or a lower temperature.

Spiral Effect in Silk Knitted Tie

We enclose herewith a silk knit tie, a sample of the outside material of which this tie is made, and also a sample of the inside lining. Trouble is experienced with this tie in that it does not hang straight in the retailer's window. It displays somewhat of a spiral effect which is a disadvantage against a good display being made of the tie. Will you kindly advise us if you know of any way that we could overcome this difficulty? (5586)

The samples of necktie fabric have been produced on a circular knitting machine, consequently have been made in a spiral manner. Inasmuch as the stitches are knitted one after the other, the fabric is bound to assume somewhat of a spiral character in the finished goods. When a number of stitches are knitted across a section of a machine, all on the same motion, the fabric will then lie flat. Where a circular machine is employed with a tuck stitch attachment, the fabric will also lie flat, as it possesses a double row of stitches.

We would suggest in the present instance a stiffer dressing solution when finishing the piece goods before cutting. A stiffer lining perhaps would help somewhat, although there is danger of it destroying the flexibility of what appears to be a very beautiful piece of goods. There is also a possibility that by changing the bias of the stripe in cutting to the opposite direction a better result would be obtained.

Ring Diameter for Cotton Counts

Here is a problem which would probably be of interest to spinners and also machinery builders. What effect would it have on a spinning frame, say with a 2 in. ring, for standard size and spinning say a No. 15s warp with the size of bobbin at barrel 5/8 in. diameter, and the spindle speed 7,000 R. P. M., to take the same frame and change over to say 30s warp, increase the spindle speed to 8,500 R. P. M., with the same 2 in. ring but with the diameter of bobbin increased to 1¼ in.? In other words, could a 2 in. ring be standardized to spin from a range of numbers up from No. 15s, if the diameter of the bobbins were increased or decreased according to number of yarn spun? (5589)

The construction of a ring frame of standard ring diameter and also standard gauge and traverse would have some advantages from the machine builder's point of view, as he might be

able to effect some economies in construction. This plan, however, would seem to involve a standard spinning spindle, or at least a spindle with a standard blade, and this is something that the cotton spinning world would be very slow to adopt.

No one can say with certainty just what would result from an effort to spin both fine and coarse yarns in the same ring by using bobbins of larger diameter for spinning the fine yarns. The suggestion of a bobbin of larger diameter for fine yarns is in recognition of the necessity for keeping traveler tension down to a minimum for fine spinning. Traveler tension also varies with the distance through which the traveler is required to move, and on the 2 in. ring, which you suggest, would remain constant; whereas by the use of smaller rings the "mileage" of the traveler can be considerably reduced.

There is no gainsaying the advantage of a longer length of yarn which it would be possible to wind on the big bobbin running in a correspondingly big ring. This advantage would not only be seen in less frequent stops for doffing, but in a reduced cost of spooling or winding and in fewer knots in the finished goods. A serious objection to the plan of using a standard ring and bobbin lies in the increase in the number of bobbins necessary to have on hand and on the possibility of their becoming mixed in using. Another objection from the manufacturer's point of view would be the necessity for giving up more room to his spinning department than is now necessary with the smaller rings and gauges.

Rayon Stripe in Woolen Goods Broken

Will you kindly favor me with information in connection with the finishing of fabrics having a rayon fancy stripe, the body of the fabric being wool. The problem I am interested in at this time is how to overcome the rayon stripe breaking in the stretching after fulling. The wool used in the fabric is of such a low grade that it does not go up in the fulling nearly as quickly as the fancy stripe which is made from rayon fibre, and in the stretching it breaks causing the fabric to appear as though the fancy thread were out for an inch or so at frequent intervals.

I am wondering if other mills are successfully using the rayon as a fancy decoration in connection with low grade wool, as the rayon simply jumps up when the goods are wet, while

the wool is much slower in fulling. Any assistance or suggestions which you can make will be greatly appreciated, as the fabric aside from the above feature is quite satisfactory. (5587)

We would suggest that the rayon be beamed separately and be run as slack as possible while beaming. The body of the fabric being wool of a low grade will give more readily and stretch, while there is little elasticity in the rayon. It would only break in the stretching of the fabric. Rayon for decorations is run very slack so as to avoid breaking in the stretch. This being an all-wool fabric, the trouble is probably in the layout of construction. This matter should be taken up with the designer.

Splicing Ply Yarns for Tire Fabric

I am writing to you to see if I can learn anything of a method of splicing ply yarns when weaving cord tire fabrics. I have been informed that the warp yarns in this case are sometimes spliced, instead of using the customary weaver's knot. (5588)

There are instruments on the market used in splicing such cords so as to avoid a knot in the complete cord. They operate something like a twist counter, to untwist the ends of yarn that are to be united. After removing the twists the individual ends are tied, one at the extreme right, one in the center, and one at the exereme left of the untwistd lengths. After this, the twist is replaced in the finished cord and the ends removed from the instrument. This operation is used on the finished cord and not upon the ends of single yarn that go into the first ply strand. Such instruments can be obtained from some of the houses that specialize in the manufacture of special machines and devices for the trade.

Determining Moisture Content of Knitting Yarn

Does the average knitting mill test the yarn it purchases for amount of moisture it contains? What is the testing equipment ordinarily used? When cotton or wool yarns are placed in an oven for testing their moisture content, can such yarns later be used for manufacturing purposes? (5581)

It is safe to say that most knitting mills do not test purchased yarn for moisture content. In fact, many knitting

mills take no notice whatsoever of the moisture content of their yarn. Even mills that wax, oil or condition their yarns are apt to neglect the moisture contained. Waxing has little to do with moisture content. Oiling usually adds moisture because the oil is mixed with water. Conditioning, which most commonly is steaming, adds moisture. However, even in oiling and conditioning the amount of moisture taken on or held in the yarn is neglected, the only interest being to fit the yarn for knitting without thought of why it becomes so fitted.

Equipment used for this purpose is a drying oven and a set of fine balances. The oven may be either electric or gas. It should be equipped to weigh the yarn in the oven, thus eliminating any question of regaining moisture before or during weighing. Yarn which have been brought to the bone dry state should not be used in manufacturing. However, moisture content is generally based on a series of samples taken throughout a lot of yarn and these do not represent a great loss of material.

Test for Rayon

In TEXTILE WORLD of May 2, 1925, on page 37, some chemical tests are given for identifying different kinds of artificial silk, and the reagent referred to is described as equal parts of concentrated sulphuric acid and iodine. Can you inform me as to just what these terms mean? Does concentrated sulphuric acid mean perfectly colorless, chemically pure acid, or the ordinary brownish acid used in the trade? Also, is the iodine the ordinary tincture of iodine, or is it iodine crystals? If the latter, are the equal parts by weight or bulk? I shall be greatly obliged if you will inform me on these matters. (5614)

C. H. Hamlin, who gave the test referred to in the inquiry, replies as follows: The acid used is chemically pure of 95% acidity. The iodine is in the form of a solution which can be prepared as follows:

To 1 gram of potassium iodide in 25 cc. of water add iodine crystals until a saturated solution is obtained. Pour off the upper clear layer and dilute this to about 25% to 50% of its strength. Add an equal colume of the sulphuric acid to this solution and submit rayon samples to be tested to this combination. The iodine solution will keep indefinitely if stored in a dark place. The iodine solution and acid should only be combined together when tests are to be made.

We have had several inquiries concerning this test and are preparing a short supplementary report giving the above information. This will probably be issued by the Associated Knit Underwear Manufacturers of America in their publications. Wherever possible in differentiating rayon, reference should be made to authentic samples.

Poor Plating on Hosiery

We are enclosing a woman's silk and fibre hose made from 3-thread tram plated over 150 denier rayon. The filament of the 150 denier is 18. Our difficulty in the manufacture of this particular line is that we cannot seem to cover up properly the 150 denier rayon with the tram. After the goods have been dyed they seem to have a harsh, stiff feeling, and on stretching with the finger the artificial silk shows up very plainly. The stocking also seems to show the artificial silk through the tram without stretching.

Please examine the sample at the point where we have sticker attached. This particular spot has been stretched, which explains the difficulty we are experiencing. We have not been able to obtain the soft, silky feel, and we were wondering if you could not give some information that would help us in this instance. Please examine the sample carefully and give us your views of this sample as to its present faults, and give us any other information that would help us to bring this sample up to our expectations. (5598)

We have examined the sample submitted and find that what is said above holds true. We are inclined to feel that this plating proposition is as well done as can be. Note that a 3-end tram is used with a 150 denier rayon. This 3-end tram is probably three ends of 13/15 denier in the gum or about the equivalent of 42 denier in the gum. The boil-off for this is probably between 20% and 25%, which brings this yarn down to about 32 or 33 denier boiled off. In this stocking, then, the attempt is to cover a 150 denier yarn with a 32 denier yarn, or with one only about one-fifth of the size. Real silk has a much better covering ability than rayon, but it is asking too much to expect this 3-end silk to cover the 150 denier rayon.

Stockings made with 3- and 4-end tram in conjunction with 150 denier rayon are fairly common, but our observation is that the real silk is not always plated on the outside as would at first be expected. Some mills are using the real silk on the

inside, covering it with the rayon. This gives the strength and elasticity of the real silk, the luster of the rayon, and a uniform face appearance, because the rayon covers the real silk. Other mills are using these two strands twisted together. This gives the strength and elasticity of the silk and the luster of the rayon. The surface is uniform in texture throughout due to the yarns being twisted.

If you are particular to put out a stocking with real silk plated over rayon, we think you must use at least a 4-end tram to cover a 150 denier rayon, which, of course, means a more expensive stocking. This should also give the stocking more of the real silk feel. However, we are inclined to think that stockings like this sample will be quite acceptable to that portion of the trade asking for the 3-end tram and 150 denier rayon.

Discharging Dyestuffs from Woolen Fabrics

We are very much in need of some technical information regarding the marking of colored woolen fabrics by the process of bleaching or stripping the color by the use of stencil and the application of some proper stripping agent, the stripping to be done by the application of a liquid either by a brush or by an air brush. Our difficulty is not with the stencil but with the proper material for doing the work. This process is required for a colored fabric. (5603)

By stenciling or printing with a suitable stripping or discharging agent (preferably a formaldehyde sulphoxylate) and then steaming for 3 to 5 minutes at 212 deg. F. in the absence of air, then washing and soaping, a fairly white effect could be obtained on the woolen goods if azo dyes had been used in the coloring. The discharge paste could be made up using 200 parts of the discharging compound, 350 parts of water, and 450 parts of wheat starch thickener.

Stains on Goods from Kier

We have been having trouble with stains occurring in our iron kier and enclosed you will find some samples that we have boiled out in the kier with different formulas of caustic soda, soda ash, silicate of soda, and pine oil soap. In some of the boils we have eliminated the pine oil soap altogether, and in other boils we have eliminated the silicate of soda. The per-

centage of caustic, also soda ash, we have varied from 1½% to 5%. We have also varied the length of the boil from 8 to 16 hours, boiling anywhere from no pressure to 15 pounds pressure. We have also tried blowing off the kiers immediately after the boil, and in others we have let them come down gradually. We have rinsed in the kier with hot water and have also tried cold water.

The brown samples enclosed are right out of the kier, having not other treatment than the boil and being rinsed. The finished samples have had the boil, sour, wash, chemic, wash, sour and wash. We have put some of these goods that have gone all the way through the bleaching process back into the kier, reboiled them and put them through the entire bleaching process again without affecting or removing the stain. The nearest that we have come to removing the stain has been to treat with oxalic acid after the boil, then re-boil and bleach.

It has been our opinion that this stain is partly composed of rust, but we have been unable to stop it from occurring in the kier; also have failed in removing it from the goods that have already been bleached. We might add that we do not think the rust is occurring from the kier itself as there are no spots on the cloth where it comes in direct contact with the kier. The inside of this kier has been painted with lime, cement and alum, and looks to be in very good shape. These stains occur mostly in the bottom half of the kier and around the center part. We have had some lots come through where the top half of the kier has been absolutely free of these stains.

(5602)

An examination of the samples of cloth submitted shows the stains to be what are commonly known as lime stains. Chemical analysis of the stained portion of the goods gives a decided test for calcium, together with traces of iron and aluminum. This is to be expected as small amounts of iron are almost invariably found in this class of stains.

To remove these stains a treatment with muriatic acid is recommended; treating the kier-boiled but unbleached goods for about 1 hour at 100 deg. F. in a solution containing 2 gals. of muriatic acid to 100 gals. of water. Then washing and chemicking in the regular manner is sufficient to produce a clear white without stains. The bleached goods should be given a similar acid treatment, but as the stains seem to be fixed more firmly on the fibre, it is necessary to raise the temperature to 130 to 140 deg. F.; after this sour a light chemic may be needed to completely remove the stain. In giving the treatment with muriatic acid, iron kiers or tanks must be

avoided; wood or soapstone kiers or jigs may be used, or better a dolly washer or similar machine where the goods will receive some mechanical treatment as rubbing and squeezing.

It is difficult to state the exact cause of these particular stains and the method of preventing them in the future without knowing the working conditions. Where the lime method of boiling is used this class of stain is encountered frequently and the trouble can usually be traced to the lime used in the kier. In the caustic boil the origin of these stains is more difficult to determine. Hard water containing large amounts of calcium is liable to cause trouble; and occasionally calcium salts are found in the sizing of the gray goods. It seems probable, however, in this particular case that the lime comes from the inside coating of the kier. It is suggested, therefore, that a lot of goods be boiled in a kier which has not been painted with any lime, cement or whitewash. Although not absolutely necessary, it is good practice to protect the goods from contact with the kier by lining the sides with heavy canvas. Boil for 8 to 10 hours, with 3% caustic soda under 10 to 15 lbs. pressure, blow off immediately, rinse first with hot water and then with cold. If desired, soda ash and silicate of soda may be added, as these detergents should not aid in the formation of lime stains. These precautions should eliminate the trouble, but if stains still occur, the water used in kier boiling and any preliminary treatments should be tested for hardness and the gray cloth tested for presence of calcium salts.

Gelatine Printing Rollers

Is it possible for you to inform us on the best manner of mixing gelatine, for the purpose of preparing gelatine printing rollers. We are not sure whether a question of this kind is within the scope of a textile publication or not, nevertheless, we trust you can assist us in a direct or indirect manner.

(5619)

A printer of cotton goods replies as follows: We do not make what gelatine rollers we use as it is rather a ticklish problem. The metal core or central shaft is properly centered in a suitable mould and a rather thick or heavy solution of gelatine poured in. The solution must also contain some hardening agent which in most cases is formaldehyde or sometimes chrome alum, perhaps from 3% to 5%. Too much must not

be used as the mass will coagulate all too quickly, causing the roll to become too brittle and not retain the desired rubber qualities. Buffing mechanically naturally follows. Probably the greatest difficulty arises from the presence of air bubbles which cause imperfect rollers. Bichromate and exposure to sunlight may be employed but fromaldehyde is doubtless the best agent. We have our rollers made and have to specify whether they are for cold or warm weather use.

Low Breaks on Tire Yarn

I would like to get a little information from you, if possible. I am in trouble with the twisting of cable yarn for cord tires. It does not seem possible for me to hold my breaks up where they belong, they run from 12 to 20 lbs. from the same yarn and twister. The single yarn is breaking 117 to 120 lbs., 23s single, from 1¼ in. American cotton. The breaks on the cable should run 17 to 18½ lbs. single strand. I have tried everything I know, even to changing cotton but the results are the same. It does not seem possible that twisting would affect yarn that way. The single seems to run very even from the spinning room. I am using 9.6 draft, 18.36 turns per inch in the single, and 20 turns in the 5-ply, with 8.7 turns in the cable. The 5-ply seems to hold up all right but I do not get the break off the cable twisters. We have twisters with single roll vertical rings. I would appreciate any information that you can give me on this matter. (5617)

We have tested the strength of the yarns furnished for examination. A single thread testing machine was used on all of them, as the amount of each kind of yarn furnished was quite small. The results of testing the 23/5/3 and the 23/5 were as follows:

23/5/3	23/5
15.44 lbs.	4.96 lbs.
16.75 lbs.	4.85 lbs.
16.32 lbs.	4.81 lbs.
15.44 lbs.	4.59 lbs.
16.10 lbs.	4.79 lbs.
16.01 lbs. av.	4.80 lbs. av.

There were four skeins of single yarn, two of which were marked "weak" and the other two "strong." A single strand test on these four skeins gave the following figures:

WEAK

No. 1	No. 2
11.08 oz.	11.69 oz.
11.86 oz.	13.62 oz.
12.42 oz.	11.65 oz.
12.42 oz.	9.88 oz.
11.33 oz.	11.99 oz.
13.35 oz.	9.88 oz.
11.69 oz.	9.18 oz.
11.08 oz.	11.65 oz.
9.60 oz.	10.58 oz.
12.56 oz.	12.48 oz.
11.74 oz. av.	11.26 oz. av.

STRONG

No. 1	No. 2
9.24 oz.	8.61 oz.
8.89 oz.	11.36 oz.
10.58 oz.	11.64 oz.
10.58 oz.	9.95 oz.
10.79 oz.	10.52 oz.
10.37 oz.	10.72 oz.
11.64 oz.	11.14 oz.
10.30 oz.	12.41 oz.
10.79 oz.	9.95 oz.
12.13 oz.	11.50 oz.
10.53 oz. av.	10.78 oz. av.

In making these tests the yarn was used in the condition as found and the figures given are those actually obtained without correction for possible differences in the hygroscopic condition. While breaking the 23/5/3, the strands all broke at once, which would indicate that all strands were carrying their share of the load. This was true even when the strain was applied very slowly in some special tests not shown in this report.

Our tests on the 23/5 showed no abnormal conditions that would indicate an irregular arrangement of the single yarns in the 5-ply. The single yarns as shown from the four skeins

submitted are finer than No. 23. The skeins indicated as "weak" averaged No. 24, while the others averaged No. 25.

It might be worth while to increase the spinning twist slightly in an effort to make the single yarn stronger. From what experiments we have made it appears that in order to make the strongest possible ply yarn from a given cotton, it is necessary to commence by making the strongest possible single yarn. The amount of spinning twist now being used (said to be 18.6) is not enough to secure the strongest single yarn from this cotton. Although there are no distinguishing marks on the raw cottons sent with the yarns, one of them seems to draw consistently longer than the other.

The use of a twister with a single roll does not seem the best arrangement on account of the possibility of these heavy ply yarns pulling through. A complete turn of the strands around the top roll may help to improve the situation in this respect. This is about all that appears from the meager amount of material and information at hand.

Tweed Yarn

Enclosed you will find a few strands of tweed yarn. Will you kindly inform me what in your estimation is the best stock selection and method of manufacture to secure this result? (5624)

A good grade of B super wool is best suited for this class of goods. The nub effect is secured by the use of an automatic nub machine. This is generally placed on the second breaker of the carding machine and can be adjusted to deliver the desired percentage of nubs to the stock at this point of the carding process. The finisher card should be set open to prevent carding out the nubs, as a rule only a couple of workers being set down to the actual working point.

Irregular Lengths in Silk Stockings

We are having a great deal of trouble with irregular lengths in silk stockings. The enclosed two stockings were knit with 11-strand extra silk, 50/2 gassed mercerized top. Please examine them and advise what, in your opinion, is the cause for variation in lengths. Both of these stockings were run from the same lot of silk, and you will note that they are the same size. (5609)

After a close examination of these two stockings we have concluded that the trouble is with the knitting and not with the yarns. Even a superficial examination showed that the texture of the two stockings was not the same, which led to a closer examination of the texture, particularly with respect to courses per inch. Made on machines having the same number of needles and boarded to the same width, these showed the same number of wales per inch in the various parts but the courses per inch differed. If the total number of courses in the stocking are the same, then the more courses per inch there are the shorter the stocking will be. The total courses in the leg of each stocking is the same.

The following tabulation shows the corresponding courses per inch in the two stockings:

COURSES PER INCH

	Short	Long
Top of silk boot	47	37
Lower end of fashion marks	32	28
Just above splicing	29	28
Instep	32	33

In conjunction with the above table, the following tabulation shows the lengths of the various parts:

LENGTH OF PARTS

	Short	Long
Leg	26	28.5
Boot	18.25	20.75
Foot	10.5	10.5
Instep from heel to ring toe	5.125 to 5.25	5.5 to 5.75

The table of courses shows that the long stocking had fewer courses per inch, which accounted for the additional length. The difference in courses is gradually less as the ankle is approached. There is very little difference in the foot. This would lead to the belief that the stitch cams have drawn too short a stitch at the top of the short stocking but approached the standard stitch gradually as the leg was knitted. If the stitch cams are responsible, the cam which controls the stitch is probably not correctly adjusted. On a Banner type, the movable section of the support for the stitch cams is not

drawn in near enough to the center. On a Scott & Williams type, the slanting piece attached to the pattern is not high enough and does not raise the cylinder far enough to make the desired length.

The table of lengths shows that one stocking is about 2½ in. shorter than the other, and that this difference is in the silk boot and not in the cotton top. This would lead to the belief that the stitch of the cotton top is correct and so the cams are also set right for the silk leg. If this is so, the tight stitch of the short stocking is probably due to excessive tension on the silk yarn. This excessive tension causes a short stitch especially noticeable where the stitch is long. As the stitch is shorter, the tension makes less and less difference so that finally on the tight stitch of the ankle and foot, the difference is not noticeable. Notice that although the foot shows the same length, the silk portion is slightly shorter for the shorter stocking.

Of course, two stockings are hardly sufficient to call conclusive evidence, but the indications lead to the belief that the short stocking has too much tension on the silk yarn during knitting.

Bleaching Merino Underwear Fabric

We are manufacturers of underwear made from merino yarns, approximately half wool and half cotton. We are having a great deal of difficulty in bleaching this material to a satisfactory color without rendering the fabric harsh. We have had the greatest success with a bisulphite solution, but this process leaves the cloth muddy in color. Peroxide renders the cloth too harsh. Kindly give us any information which will help us to arrive at a satisfactory color with a kindly handle. (5597)

The peroxide method of bleaching is the ideal one for this class of work. The fact that you are obtaining a harsh handle with this method is due to one of two causes: either the procedure is not correct or you are using a water of considerable hardness.

The bisulphite method of bleaching is the more economical and simpler of the two, but it does not give a permanent bleach on wool. Rinsing or soaping will cause the wool to regain its original color. On cotton it has practically no bleaching value.

You do not specify whether you are using the sodium

peroxide method or the hydrogen peroxide method of bleaching. The liquid hydrogen peroxides on the market contain some acid and if the bleach liquor is not prepared correctly, silicic acid may be formed when the silicate of soda is added. In order to counteract this, first add to the water one-quarter pint of ammonia to every 100 gallons, then add the hydrogen peroxide, stir well and then add 2 lbs. of silicate of soda to every 100 gallons of water. Stir well and then raise to 130 deg. F., and enter the previously scoured material. After the goods are entered, the temperature should not exceed 125 deg. F.

Should the sodium peroxide method be used, make certain that the sodium peroxide is completely neutralized with sulphuric acid. It is just as important to keep the liquor off the acid side as it is the alkali side. When neutral, add one-quarter pint of ammonia and 2 lbs. of silicate of soda. Then proceed, as mentioned above under hydrogen peroxide. Great care must be taken that all the chemicals are rinsed out of the cloth. This will require at least three fresh rinse waters at 100 deg. F.

Stripping Vat Colors from Cotton or Rayon

We are anxious to obtain information on methods of stripping vat colors from either cotton or artificial silk. (5601)

Probably the most satisfactory method of stripping cotton goods dyed with vat colors is to boil the goods in 10% of caustic soda, and 5% red prussiate of potash (percentages figured on the weight of the goods); rinse, and then boil in a soap solution containing 5% of soap and 5% of acustic soda. It may be necessary to repeat the process. Stripping vat colors with hydrosulphite of soda and caustic soda is not as satisfactory, because what color comes off in one place may go on in another place.

Artificial silk could probably be stripped in the same way, but the luster would be somewhat destroyed. If cellulose-acetate silk was used, the caustic soda used for stripping would probably saponify the artificial silk and so change its constitution.

A dyer replies to this question as follows: The stripping of vat colors from cotton is a difficult and not very satisfactory process. Vat colors are fixed on the fibre in a form insoluble

in water. In order to make them soluble they must be chemically altered by reduction with sodium hydrosulphite and caustic soda. The temperature at which they go into solution best differs with the individual dyestuffs themselves, varying between 100 to 180 deg. F. They are best stripped by entering into a bath containing the amounts of caustic and hydrosulphite best suited for the reduction of the particular dyestuffs used. The cloth is run at the proper temperature until the shade has come down enough in depth for the purpose, or until streakiness (if present) has disappeared.

The relative amounts of caustic and hydrosulphite to be used in stripping depend upon the quantities necessary for the solution of the dyestuffs used. However, 5% caustic soda (on the weight of the cloth) is generally sufficient. Enough hydrosulphite should be used to keep the stripping bath thoroughly reduced and small quantities may be added from time to time. The material should be exposed to the oxidizing influence of the air as little as possible during the stripping operation. This process will work well with some of the more soluble vat colors, but as mentioned above, it is not satisfactory in all cases.

The same principles apply to artificial silk, but we have another factor entering into the equation in this case. The physical and chemical nature of artificial silks make it imperative to avoid high temperatures, strong alkaline solutions, and prolonged treatment in dyeing. It is far better in the case of artificial silk to throw the goods into a darker shade than to attempt stripping. The comparatively harsh treatment necessary to strip vat colors would cause the silk to become frayed and harsh and to lose a great deal of its luster.

Rub Aprons Loose at Middle

I have been having trouble with rub aprons on wool card condensers. The apron is loose in center with proper tension on ends. If tightened up any more it causes the apron to wrinkle in center. I cannot get a perfect draft between wipe rolls and aprons, between the aprons, or between aprons and spools, as I do not get the roving rubbed properly. The soft roving draws tight on spools, causing trouble in the spinning room. I can get away with the work on wool without anybody noticing it, by drawing my work tighter on the spools; but on low cotton waste the stock will not stand the draft. Some of

my condensers are practically new, with perfect bearings and rolls. (5632)

The trouble no doubt arises from the aprons having been stretched too tightly when they were put on new, which is often the case. About the only remedy is to take out the rolls and wrap the centers with tape, which will take up the slack in the centers of the aprons, owing to the larger surface of the rolls in the centers.

Oil Streaks in Hosiery

I am enclosing herewith a pair of silk stockings. There is a very light streak running the length of the stocking which the manufacturer claims comes from the oil, and which the dyer has been unable to eradicate. I am anxious to have this streak analyzed and if it proves to be oil would like some suggestions as to how the streak may be removed. The streak is very faint and more visible in some lights than in others. I have marked the top of the stocking with two pencil marks, and the streak starts approximately midway between these two marks. (5607)

A dyer replies to this question as follows: Upon examining the sample of hose I am inclined to agree that the stained streak is primarily caused by oil. Chemical tests made by extracting the sample with ether and other volatile solvents do not show any unsaponifiable oil present. This is not surprising, inasmuch as the degumming process is carried out in a mildly alkaline soap bath. This would remove most of the oil if it was a light oil such as is used on light machinery. It would not remove the stain caused by the pigment of the oil unless stronger alkalies and emulsifying agents were used. The dyeing of the hose was no doubt done in a broken gum-soap bath which made some of the soap deposit in the form of a complex soap curd along the incompletely removed oil stain. This formed a resistance, or at least an unequal affinity, for the dyes used.

I agree that the dyer is helpless to aradicate the trouble unless he sees it before he has completed the degumming operation. A partial removal of oil in textile materials is worse than no removal at all. Oil removal must be rapid and complete, without allowing the goods to dry or allowing the temperature of the bath to change suddenly. Once an oil stain is allowed

to dry and set in the goods it is well nigh impossible to remove it. I have tried to remove the stain after the extraction with ether by using the most powerful emulsifying agents which will not harm the goods. The stain did not come out.

Upon the chance that the spot might be iron or some other metal, the hose was oxidized with permanganate and the oxides dissolved in a solution of oxalic acid and sulphuric acid. The stain still persisted. The hose was then stripped of color with a hydrosulphite. There is a faint trace of the spot remaining. I suggest that the hose be examined before the degumming and any stockings found to have oil stains in them be dipped in a solution made up of 2 lbs. olive fig soap, 8 oz. Posovan soap, 8 oz. Potts emulsion, per gal. of water. The hose is to be dipped in the soap solution and rubbed in the hands for a few moments, then put with the others and degummed in the usual manner.

Uniform Cloth and Counting the Stitch

I am having trouble in my knitting department with 2/24 worsted yarns on bathing suits on 8-cut latch needle machines. It seems that my blacks and navys run heavy and that the lighter colors, such as jockey red, run light, although the yarn all weighs the same. Can you tell me a way of making my cloth all uniform, and the best way of counting the stitch? I use a stitch glass and also measure the yarn as it runs into the machine. I mark one end and run the machine 20 turns at 20 stitches per inch. It will come 8 in. on the cloth from mark to mark on an 8-feed machines. Can you give me another way of testing my cloth? (5620)

The probable reason for the different colors running light and heavy is that they are from different lots and the quality is not the same. Take a poor 6s quality and a good 7s, although they may weigh exactly the same per 1,000 yards of yarn, when you knit them up in a piece of fabric the part made from the good 7s will feel and look full and thick, while the part made from the poor 6s will look and feel lean and thin. Also we have known of one lot going to the dyehouse to be dyed into different colors and when it was made up in a piece of cloth some colors would appear to be of a lower quality. Whether this was caused by the dye or some of the processes used in dyeing, we would not attempt to say.

As to counting the stitch, the inquirer should remember that

the instrument knitters call a "stitch glass" is made primarily for the weaving branch of the industry whose material stays "put" after making. With a piece of knitted fabric there can easily be quite a wide variation in the count if counted by different persons or at different times or under different conditions. Therefore, the use of the stitch glass may do very well for approximation, but it does not tend to accuracy.

To secure the most uniform results, our experience has been that the best method is to measure off a given length of yarn from the yarn carrier, back say 12 to 24 in. as most convenient, and adopt that as a standard. Now mark this thread at the yarn carrier, also at end of measuring stick. Turn the machine by hand until both marks have run in the needles, then count the needles between the marks. By keeping this count the same on all feeds and the different machines, with the take-up uniform, and on rib machines the dial or secondary bank of needles with the same draw, uniform results should follow, with yarn of like kind and quality.

Bands Running Around Stockings

We are enclosing a sample of two stockings, dyed, on which we would appreciate receiving from you a report as to the cause of stripes running around the stocking. By holding these stockings up to the light, you will observe that the stripes appear irregularly throughout their length. We have tried repeatedly to overcome this defect. Up to the present writing we are still unsuccessful. Whether or not the cause of stripes is in the yarns or the dyeing we cannot say. We have inspected the yarns and the dyeing separately and collectedly and we have failed, in every method we use, to ascertain the cause of these stripes. Both of these stockings are made from 3-thread tram over 150 denier artificial silk. We would appreciate it if you would give these stockings your careful inspection, giving us a report on same and any other information you can, as soon as it is convenient for you. (5621)

The seamless full hose samples submitted showed rings or bands of noticeably heavier texture. The bands ran around the stockings and varied from about ¼ in to ¾ in. in width. Because the variations in appearance followed the courses, they would seem to be due either to stitch variations or yarn variations. An examination of the texture of the normal parts

and the bands, under magnification, showed no difference in wales and courses per inch.

The bands were marked and then the stockings were raveled to procure yarn for sizing. Because each band had so little yarn, care was taken to use all the yarn in the bands and in the sections between them. These lengths were weighed on an accurate milligram balance. The lengths, weights and equivalent sizes are listed here.

YARNS IN SILK AND RAYON HOSE

Rayon Yarns

No.	Texture	Yards	Weight	Denier
1	Heavy	16.0	.235	144.8
2	Normal	48.0	.750	153.5
3	Slightly heavy	24.0	.375	154.5
4	Heavy	4.5	.072	157.5
5	Normal	121.5	1.880	152.6
6	Heavy	7.5	.120	157.5
7	Normal	87.0	1.372	155.5

Silk Yarns

No.	Texture	Yards	Weight	Denier
1	Heavy	16.0	.066	40.66
2	Normal	48.0	.137	28.25
3	Slightly heavy	24.0	.081	33.26
4	Heavy	4.5	.020	43.75
5	Normal	121.5	.408	33.06
6	Heavy	7.5	.031	40.69
7	Normal	87.0	.300	33.94

The silk yarns were plated over the rayon and the numbers show which lengths came from the same portion of the stockings. The first three lengths were taken from the yellow stocking, while the others are taken from the gray stocking. The column headed "texture" indicates those lengths taken from the heavy and normal portions of the stockings. The fourth column shows the weights of the respective lengths in grams. The fifth column shows the sizes of the various yarns based on the lengths and weights in the third and fourth columns.

The rayon yarns seem to check up quite closely to the 150 denier which is given as the size used. These check very well

considering the length obtained. The extreme variations from 145 denier to 157.7 denier is less than 10%.

The silk yarns do not show themselves to be so uniform. In each instance the fabric of heavy texture yielded silk yarn heavier than normal. The extreme variations in the silk yarns, from 28.15 denier to 43.8 denier, represent a variation of nearly 50% on the basis of the nomal size. This yarn is given as 3-thread tram. If we assume this to be 13/15 denier for the single ends, the equivalent is about 42 denier. Allowing 20% boil-off, this size would be decreased by 8.4 deniers or would be 33.6 denier with 20% boil-off. This checks well with all the normal texture fabric except No. 2, which may be from a fabric slightly lighter than normal.

In any event, these figures serve to indicate that the fault is due to varying silk yarns. Since this has come to our notice in other cases and is often prominent in all-silk stockings, there is no doubt but that the trouble is in the silk yarn. If more conclusive evidence is needed, the silk yarn might be knitted alone on a fine machine to show that it does produce these bands.

Monel Metal for Lining Dye Tubs

Will you please advise us in reference to any information you can give us regarding monel metal, which is used for lining dye tubs. We understand that this must be soldered with either silver solder or brazed. We also understand that if the joints were soldered with ordinary solder that the aniline dyes or the acid that they might contain would affect the solder. Will you please advise us if you know anything regarding this.

(5618)

The International Nickel Co., New York, reply to this question as follows: Lead tin solders are sometimes used for this purpose, but it has been found that the points are affected by some of the acids and alkalies used in dyeing. In order to make monel metal equipment suitable for practically all classes of dyeing, the use of silver soldered seams is highly recommended. Such silver solders contain approximately 40% of silver, and are obtainable through Handy & Herman, 82 Fulton St., New York, who have spent considerable time developing the most suitable silver solder for this work. Such joints are usually constructed with a lockseam. The inside of the seam, which will be in contact with the dye liquor, is silver soldered.

The solder must necessarily be applied with a torch similar to the method of brazing, because of the comparatively high melting point of the silver solder. Soft solder is then sweated into the outside of the seam, making an extremely strong and satisfactory seam. Welding is also a satisfactory methods of making joints, and this method is also in use, the flanged weld with oxy-acetylene torch being the most satisfactory. Instructions on the welding of monel metal can be obtained from The International Nickel Co. If you are not in a position to do this class of work yourselves, there are a number of concerns who make a specialty of the lining of dye tubs with monel metal.

Finishing Seersucker

Will you be kind enough to obtain for us the following information. The enclosed seersucker cloth is shrunk so it will stand repeated washings and ironings without shrinking in the garment. Will you please advise us what machinery this cloth passes through and what materials or ingredients are used to finish the cloth for "shrinking" from the time it leaves the loom until ready for case? Is the crinkled effect obtained in the yarn or is it done in the finishing? If the latter, please advise how to obtain it. (5638)

It is, of course, understood that the crinkled effect is obtained by the manner of weaving, being fixed or made permanent, and in fact improved by the process of bleaching and shrinking. The inquirer does not state whether the goods are made of white bleached yarns or gray yarns. If they are made of white yarns, all that is necessary is to pass the goods through a hot soap solution in a reel type or slack washer, and allow them to lie for two or three hours, after which they should be again washed through lukewarm water to remove all soap. The goods then should be opened on a scutcher and dried on an automatic tentering machine, set at the width which the trade demands. No stretching is really done on the tenter, the goods simply being hung on the automatic clips to dry, the drying operation assisting in the further shrinking of the fabric as it is passed over the tenter.

The sample submitted shows the effect of having been finished on a pin tenter. If the goods are made with gray yarn instead of white yarn as shown on the finished sample, it is of course necessary to boil them in the so-called open type bleach-

ing kier, or Bennett system, with soap and soda ash, the assumption being that the black stripe or warp threads in black are dyed fast colors.

The boiling operation in the open width kier consists of treating with about 2% of soap, 1% to 1½% of soda ash, for a period of 8 hours at 190 to 195 deg. F., after which the goods should be washed through a slack type washing machine in rope or strand form. They should then be treated with either peroxide bleach in a circulating wooden kier or otherwise with soda chemic or very weak chlorine liquor to bring up the white on the gray yarn portion of the goods.

After bleaching in this manner, goods should be properly neutralized with anti-chlor and again washed, passed over the scutcher and tentered to width as previously mentioned. In conjunction with the tenter, it would be necessary to use some type of heating system for blowing hot air on the goods in a totally enclosed housing.

A finisher replies to this inquiry as follows: The fabric is a regular seersucker in its organization, the crinkled effect being obtained in the weaving. Regarding the shrinkage of this fabric, most of the cloths of this class are shrunk by washing with a neutral soap, rinsing them thoroughly, giving them a complete saturation, and then drying them with as little tension as possible. This particular piece seems to have been smoothed a little, evidently with a light calender or possibly a laundry mangle with an apron or wrapper.

Boiling-Off and Dyeing Hosiery in One Bath

We have recently used a number of different formulas for boiling-off and dyeing hosiery in the same bath with varying results. Our hosiery consists of a pure silk boot with cotton top and cotton heel and toe. We should be very much interested in seeing what you would give us as being the best in your opinion for this work. (5627)

While the very best results are not to be obtained by any method that attempts to combine the important degumming and dyeing processes, yet there are some operators who claim to secure good results by a sort of combination procedure that effects the desired end. The basis of such a combination process is as follows:

A bath is made up with about 2% silicate of soda on the

weight of the material to be treated, together with 4% to 5% of soluble oil, and a sufficient amount of a direct dye for the desired shade. After boiling for about one-half hour, there is added to the bath from 40% to 50% of glauber salt, and heating is continued until both the degummed silk and cotton have taken on about the same shade.

The objectionable part of the process is in the use of such an excessive quantity of glauber salt, but this may be overcome by cautiously adding the salt to the bath and watching the shade as it comes up, stopping further additions as soon as the proper shade is reached.

This method of both dyeing and degumming has not been regarded by hosiery dyers as the most desirable for cotton and silk mixtures, but its principle seems to be good and possibly may be improved upon after suitable experimentation. The above-described process has been actually used in a mill doing a fairly large amount of 50/50 cotton and silk stockings.

The ideal method to follow is to degum the silk first, wash well, and finally dye up whatever shade is desired. Any complaints that may subsequently arise as to defects, can then be accurately placed.

Full-Fashioned Hosiery Equipment

Could you favor us by stating in your Question and Answer columns, what kind and how many of each machine it would take to equip a mill to turn out about 100 doz. fullfashioned 42 gauge ladies' hosiery daily? It is not necessary to include the finishing department as we have that. (5608)

In order to produce about 100 doz. pair of full-fashioned stockings per day of 10 hours it will be necessary to install at least three sets of full-fashioned knitting machines; these three sets comprising nine 20-section, 42 gauge leggers and three 20-section 42 gauge footers.

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